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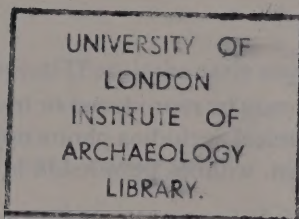


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**Professor Sidney Smith, Litt.D., F.B.A., F.S.A.**

Professor Sidney Smith, who died on the 11th June this year, less than three months before his ninetieth birthday, will be generally remembered as a distinguished scholar in the field of ancient Near Eastern Studies. Much of his life was spent in the service of the British Museum, but he also dug with Woolley at Ur in 1923 and was Director of Antiquities in Iraq from 1928 to 1931. What we should like to commemorate here, however, is his link with the early days of the Institute of Archaeology, and the great contribution which his teaching, freely given in an honorary capacity over a number of years, made to the establishment of Near Eastern Studies here on a firm basis in those pioneering days.

In 1934, when Sidney Smith was Keeper of Egyptian and Assyrian Antiquities at the British Museum, and had already for some years been acting as Honorary Lecturer in cuneiform for King's College, London, he agreed also to become Honorary Lecturer in Near Eastern Archaeology at the nascent Institute of Archaeology. Four years later the University conferred on him the title of Honorary Professor of Near Eastern Archaeology, thus making him our first Professor.

He continued to teach for us throughout the war years, until, in 1947, a part-time post of Professor of Western Asiatic Archaeology was at last created at the Institute. This was naturally first offered to him, but when he declined, Max Mallowan, at that time Director of the British School of Archaeology in Iraq, was invited and so became the first holder of the new Chair. The following year, he finally left the British Museum to become Professor of Comparative Semitic languages at the School of Oriental and African Studies. Because of the heavy linguistic content of the Institute Diploma course in Mesopotamian archaeology his association with the Institute continued and he worked closely with Mallowan, who was a lifelong friend, up to his retirement in 1955.

Among his students in those early years at the Institute were several whose names have become well known subsequently in the field of Near Eastern archaeology. They included Rachel Clay (Mrs. Maxwell-Hyslop), Barbara Parker (Lady Mallowan), Joan du Plat Taylor (later Librarian of the Institute), Margaret Munn-Rankin and Veronica Seton-Williams. We remember with gratitude his great services to our Institute and are only sorry that he will not, as was originally hoped, be able himself to read this small tribute to them.





# ‘The First Wagons and Carts’: twenty-five years later\*

by STUART PIGGOTT

When I had the honour to be invited to give the third Gordon Childe Memorial Lecture it did not take me long to decide on a topic which I thought, and I hope you will agree in thinking, was appropriate in more ways than one. In 1951 and 1954 Childe published two classic papers on the earliest wheeled transport in Western Asia and Europe, one whose title I have quoted in my own, and these, together with many discussions with him at that time, prompted my own interest in the subject. (Childe, 1951, 1954a,b.) Now, twenty-five years later, I am myself trying to make an extended synthesis of the material and the problems, so that a brief ‘state of the art’ review of the situation as I see it today would be apposite to honour Childe as a scholar and to express my personal gratitude to his inspiration.

Let us first see how Childe thought about the evidence available in the early 1950s. His approach was partly technological, but he was more particularly interested in early wheeled transport as a demonstration of his basic thesis, the derivation of cultural innovations in prehistoric Europe from the ancient East; he believed the vehicle evidence ‘provides one of the most convincing cases of diffusion’. In outline, the points he made were as follows. A first preliminary but essential factor was the nature of the evidence, which he saw (and we see today) comprised actual finds of wooden vehicles or their wheels; models; and depictions in contexts of representational art of some form, however schematic. Next, he saw the first wheeled vehicles coming into being as an answer to social and economic needs for bulk transport associated with his Neolithic and Urban Revolutions, and as the castration of cattle and the consequent employment of draught oxen for such uses as ploughing antedated evidence for wheels, local sledge or travois forms could have had wheels added to them. For the elaborate carpentry necessary for even a simple disc-wheeled vehicle, an ‘adequate supply of metal for carpenters’ tools’ was needed, and therefore a prerequisite. He then pointed out that on the chronological evidence available in 1950, the earliest wheeled transport was attested in Mesopotamia before c. 3000 BC (the Uruk IVa pictographs), and the later dates elsewhere pointed to ‘diffusion from a single centre near the Lower Tigris’. In this connection, he further noted that

\*The third Gordon Childe Memorial Lecture given at the Institute on 20 February 1979.

the wide distribution at a comparatively early date not only of simple disc wheels, but of the complex and consistent tripartite disc construction was hard to explain 'unless the device had been diffused'. The next piece of evidence of significance, Childe thought, was provided by vehicle burials in richly furnished graves of the kind he had defined as 'Royal Tombs': the 'intimate association of wheels and royalty supports the view that the use of wheeled vehicles was diffused from a single centre'. (Childe, 1951; 177, 193.) These were his main points in support of the diffusion thesis, but he added an important technological observation when he wrote 'though naturally an expression of the wheel idea, the spoked wheel was a new invention rather than a modification of the tripartite disc'. (1954b; 214.) All the questions he raised are of material consequence today, and I shall return to them as a whole at the end.

How then does the problem stand a quarter-century later? In the first place, there has been a huge increase in the primary archaeological material available for study. At a rough estimate I reckon that for prehistoric Europe, from the fourth millennium to the first century BC, and excluding the Aegean, Etruscan and early Greek world, we have around 750 finds of actual vehicles, wheels, models or linear representations, only one third of which lie in Hallstatt and La Tène. Some of the vehicle burials are spectacular, such as the well preserved six wagons, six carts and two chariots of the mid second millennium BC on the shores of Lake Sevan in the Armenian Caucasus. There have also been a number of important works of synthesis such as Boná's survey of prehistoric vehicle models in Hungary and Transylvania (Boná, 1960); Van der Waals's study of the Dutch disc wheels and their significance (Van der Waals, 1964); my own review of the evidence in relation to the Caucasian finds (Piggott, 1968), and Rostholm's new Danish evidence (Rostholm, 1977). Perhaps above all, the critical chronology involved has been given a firm framework not only by the application of radiocarbon dating, but by the recognition of its necessary correction by dendrochronological calibration. And if our attitude to problems concerning the nature of culture change and the acceptance or rejection of technological innovations may make questions framed in 1950 in simple 'diffusionist' terms look not so much simple, as simplistic, they are in need of re-thinking, not of brusque dismissal.

Before turning to review the evidence now available to us, a brief definition of terms is desirable. So far as the typology of vehicles goes, a wagon has four wheels, a cart two, and the terms to some extent imply utilitarian functions, but for reasons of status or ceremonial a wagon can become a carriage (or in warfare a battle-wagon), while similarly the two-wheeled vehicle for ceremony and parade may be best termed a chariot; in fighting, a war-chariot. The raw material for all vehicles is of course wood, and to some extent constructional details may be dictated by its availability, as in boat-building. This is especially the case with wheels, for if these are solid discs they, with their massive hubs necessary to steady the rotating disc on its axle, must be split and cut from a plank or log with a width not less than the eventual wheel, and as at an early stage an optimum diameter slightly under a metre was

arrived at, it called for trees of over that thickness. Such stems, from trees not less than two and a half centuries old, are obviously comparatively scarce in natural stands of deciduous woodland, and their felling and working proportionately more difficult than younger trees. The tripartite disc wheel, utilising timber of half the scantling, was then early developed in response to this difficulty: it must be remembered that the saw, beyond the small cabinet-maker's tool, was not in use in early antiquity, and that splitting or riving, and the use of axe, adze and gouge or chisel were the only techniques available in metal or stone. Light vehicles, with wheels composed of nave or hub, spokes and felloe, may involve an alternative bent-wood technology to which we will come later. A final general point must be made at the outset. Throughout, I shall use, wherever available and applicable, radiocarbon dates in their calibrated form, using Malcom Clark's tables of 1975 for conversion. (Clark, 1975.)

With these necessary preliminaries let us turn to the evidence at our disposal today. As Childe saw, and commonsense might suggest, the technologically simpler though in fact more laborious construction of disc and tripartite wheels takes chronological priority over other forms, and it is with such vehicles in Mesopotamia that we appropriately begin. Here the evidence is as in 1950, with the pictographs of four-wheeled vehicles with sledge prototypes in Uruk IVa, representations of disc-wheeled wagons or carriages drawn by oxen or equids from the beginning of early Dynastic I, and actual disc or tripartite wheels in the 'Royal Tombs' of Kish, Ur and Susa over the periods of ED II and III. Using the available C-14 dates, we would fall within Mellaart's scheme of a high Mesopotamian chronology, with the Uruk period c. 4000-3400 BC, and Uruk IV with a date of c. 3580; ED III has a range of c. 2780-2650 BC. (Mellaart, 1979.) The tripartite discs seem to have been of relatively thin planks jointed by external battens, and representations such as those on the Ur 'Standard' show anomalous multi-piece constructions unrepresented outside Mesopotamia. A number of pottery models, and some other representations, as on seals, carry on the evidence into the second millennium for two-wheeled chariots and four-wheeled vehicles, occasionally with arched tilts. A group of later third millennium disc-wheeled wagon models in copper, originating from an unknown centre or centres in Anatolia, have stylistic affinities, in the draught oxen that accompany them, with a tradition originating in the context of the Alaca Hüyük Royal Cemetery or of Horoz Tepe, though there is no conclusive evidence of wheeled transport from the tombs themselves.

While in that area the Uruk IV pictographs retain chronological priority, evidence for wheeled vehicles in the fourth and earlier third millennia BC exist in the form of pottery wheel models in the region to the north, from the upper Euphrates to the Caucasus, within the Kura-Araxes, or as Burney has termed it the Early Transcaucasian copper using culture, with a range of C-14 dates from c. 3600 to 2600 BC, thus running in parallel with the Uruk to ED III sequence. (Piggott, 1968; Burney and Lang, 1971: 44.) In the Caucasus, continuity in pottery traditions is clear from



late Kura-Araxes into that of the earlier graves of the Trialeti series in Georgia, where often richly furnished burials in stone-built chambers or log-roofed pit-graves have on occasion yielded remains of massively constructed wagons with tripartite disc wheels. One such, from Trialeti Barrow 5, has a C-14 date of c. 1750 BC (Burchaladze *et al.*, 1976) and here, as elsewhere in the Caucasus at a rather later date in the second millennium, the abundance of heavy timber allowed of the construction of tripartite disc wheels jointed by internal dowels in tubular mortices. This technique demands not only axe and adze, but narrow chisels or gouges, types appearing in arsenical bronze in the western Caucasus as at Maikop and Novosbodnaya, and as we shall see, contemporary Central Europe as well, both within the third millennium BC.

The dozen finds of waterlogged wagons and carts from the Lchashen tombs on Lake Sevan in Armenia, 200 km south of the Trialeti finds, give a fascinating picture of the variety of tripartite disc-wheeled vehicles in use there in the second millennium BC, including wagons with arched tilts or wicker-work sides; one has a date of c. 1500 BC (Cherdyntsev, 1968) but in the main the tombs are probably rather later. Here we also see the earliest known examples of the A-frame cart, a type surviving today not only in the Caucasus itself, but for instance in Anatolia and Sardinia, and we see how it formed the prototype of the composite draught-poles on the wagons. The elaborate carpentry and carving made possible by a full range of bronze tools is noteworthy, and in all these vehicles (and indeed in virtually all disc, tripartite or spoked wheels surviving from antiquity) the wheel turns freely on its axle, with a massive nave for stability, and is held by a linch-pin. This makes for complete ease in turning for a two-wheeled vehicle, but with four wheels a very large turning circle is needed unless some form of a turning or pivoted front axle is provided. There is to my mind no conclusive evidence that this fundamental device was employed in prehistory nor in classical antiquity, and it appears to be an invention of the early Middle Ages in western Europe (Lynn White, 1962). The burial of the Caucasian vehicles in richly furnished tombs might be thought to support Childe's postulate of vehicles in his so-called Royal Tombs.

Turning from the Caucasus to the immediately adjacent areas of south Russia to the north and west, in the steppe country from the Volga to the Dniepr, where two or three vehicle burials were known to Childe, at least 30 have now been recovered (though still very few are published in detail). All belong to the two cultures named from their burial rites as Pit Grave and Catacomb Grave, the former a log-roofed grave shaft (as at Trialeti 5) and the other a vertical access-shaft with a lateral chamber. A series of nearly 40 C-14 dates firmly place the Pit Graves at c. 3250 to 2100 (Telegin, 1977), while the Catacomb Graves, thought to overlap but to be in the main later, have on the showing of 8 dates a contemporary position, c. 2900–2400 BC (Semyonstov *et al.*, 1972). The vehicles in these otherwise poorly furnished graves, with some copper objects, are usually represented by simple disc or tripartite disc wheels alone, of wagons or carts: individual dates are c. 3100 for a simple disc at

Balki (Telegin, 1977: 11) and c. 2400 for a wagon with tripartite disc wheels at Kudinov (Berger and Libby, 1968). There seems then a sound case for wheeled vehicles on the south Russian steppe by the early third millennium BC, with tripartite wheeled wagons by the middle. Copper metallurgy is certainly present, but the graves can hardly be termed 'royal' or 'princely' except in so far as the vehicle itself may be thought to imply such status.

When we move westwards from the Dniepr to Transylvania and the Danube, the nature of our evidence changes, and we are almost wholly dependent on pottery models of vehicles or their wheels. Childe was just able to include the now well-known model wagon, or disc-wheeled cup, from the Budakalasz cemetery of the Baden-Pécel culture, and a second similar model has more recently been found at Szegeszentmarton (Kalicz, 1976). From Radošina in Slovakia, in a Boleraz context (usually placed as early Baden) is another model, without attached wheels, but with twin bovid protomai implying paired draught (Němejcová-Pavúková, 1973). We can now see Baden as the third and last of the Hungarian Copper Age phases, and three C-14 dates give a range of c. 3300 to 2750 BC. Contemporary with this would be a wheel model in an Usatovo context (for which 5 dates centre on c. 3000) (Kohl & Quitta, 1970) and thenceforward similar models continue in the Vučedol-Zók and Jevišovice B — Řivnáč contexts, pre-Bell Beaker and with a date of c. 2970 at Homolka (Ehrich and Pleslová-Štrivka, 1968). Vehicle and wheel models are frequent in the Hungarian Middle Bronze Age, beginning with a Năgyrév date at Baracs of c. 2200 BC (Boná, 1975: 77) and continuing through the second millennium. They are normally shown as simple discs, but a couple of tripartite disc models, from Bronze Age II and III respectively, show the existence of the type at this time (Kalicz, 1968: 158; Boná, 1975: Pl. 144, 13). In connection with the wood-working technology already referred to as necessary for the production of such vehicles, we must remember the precocious East European copper industry, with shaft-hole axes and adzes as early as the first (Tiszapolgar) phase around c. 4350 BC, and the two hoards of axes and chisels or gouges from Ezero IV in Bulgaria and in a Jevišovice B context at Staré Zamky in Moravia, both with C-14 dates around 2900 BC (Georgiev and Merpert, 1966; Benešová, 1956).

Vehicle burials cannot be directly demonstrated, but Childe hinted that the burial of oxen in pairs in Baden cemeteries could imply the vehicles they drew (Childe, 1957: 124). Indeed, in the graves in question there was room for a vehicle undetectable or undetected during excavation, and the same may be said of some of the paired ox burials further north in East Germany and Poland, which date from TRB 'C' into Walternienberg-Bernburg times, with dates from c. 3500 to 2850 BC (Piggott, 1968: 306). It is worth remembering, with antecedent ox-traction in mind, that castration is definitely attested in Central European Linear Pottery contexts around 5000 BC, (Bökönyi, 1974: 116) and that in TRB 'C' there are plough-marks and cereal pollen under the Polish long barrow of Sarnowo no. 8, with a C-14 date of c. 4400 BC (Gabalowna, 1970). A schematic representation of a four-wheeled

vehicle on a TRB pot from Bronocice in south-east Poland recently published, now confirms the early use of wagons in this context, probably before 3,000 BC (Milisauskas and Kruk, 1978).

Beyond the Caucasus the evidence so far reviewed does not give us much information as to the details of the vehicles themselves. The wheels in pairs from the south Russian graves imply carts, and the pottery model from Tri Brata represents a two-wheeled, square-bodied vehicle with an arched tilt; wagons of simple rectangular plan were found at Kudinov on the Don and Lolinsky on the Manych River, and both simple and tripartite disc wheels with internal dowels were in use. Neither here, nor westwards in Transylvania, Slovakia or the Hungarian Plain, is there any evidence of the A-frame cart. The Budakalasz and Szegeszentmarton models are in effect square-mouthed, high-handled cups in vehicle form, but the former has longitudinal planks incised on its base, and the outward raking sides, as if representing matting slung between poles, are echoed in some of the later Transylvanian models. These represent only four-wheeled wagons, but of course the original existence of carts as well cannot be excluded.

The final region of Europe to concern us is the west and north: the Aegean and Mediterranean coastal regions offer us nothing in earlier prehistory save the well-known model of a trolley or wagon with very small disc wheels from Palaikastro, of Middle Minoan I date in the early second millennium BC. But the Netherlands and Denmark have produced a remarkable series of actual single-piece disc wheels with direct C-14 dates from them, the achievements of wholly stone-using communities from the very beginning of the third millennium BC, and Switzerland tripartite discs of the same period. In northern Italy some rock carvings can inferentially be dated to much the same time, but the few surviving disc wheels finds there are much later.

The large Dutch series of massive single-piece disc wheels, with diameters frequently between 0.75 and 0.9 m, with sturdy naves turning on the axle, has been studied by Van der Waals in a classic paper (1964). They are bog-finds, singly or in pairs, and once (at Nieuw Dordrecht) adjacent to a wooden trackway, and have a range of C-14 dates between c. 2900 to 2500 BC and so contemporary with, and by inference a product of, the Dutch version of the Corded Ware culture represented by the Protruding Foot Beakers. There is thus no question of metal tools being used in their construction, which must have been entirely achieved by stone or flint. One or two undated bog finds in Germany and Poland may be as early as the Dutch wheels, but in Denmark contemporaneity is assured, with two finds, one of two wheels, with C-14 dates of c. 2900 and 2300 BC (Rostholm, 1977). A recent assessment of dates for the Danish Single Graves, the counterpart of the Dutch PFB graves, puts the range as c. 2850 to 2380 BC, so this is the context for the Danish wheels (Malmros and Tauber, 1975). The not infrequent finding of two wheels together may imply carts rather than wagons, but the latter are of course not ruled out. The only comparable finds so far recorded from western Europe are the three tripartite disc



wheels from an actual Corded Ware horizon at Zürich, their chronological position confirmed by a date of *c.* 3000 BC (Rostholm, 1977: 207, 214; Ruoff, 1978). Here the component planks are held together by external battens set in grooves, a technique used for repairing a crack on one of the Danish wheels, and common in later tripartite discs.

To these surviving and directly dated wheels we may add engravings on three statue-menhirs in North Italy, at Lagundo and Valtellina (Berg-Osterrieth, 1972), which are stylistically linked to the stelai at Petit-Chasseur, Sion, in Switzerland, re-used in Bell Beaker times for building burial cists, but originally referable to a position contemporary with the use of Grand Pressigny flint, and so with later Swiss Corded Ware, with a date before *c.* 2500 BC (Barfield, 1971: 67). The Lagundo stele is stylistically linked again to the carved rock face at Cemmo no. 2 in Val Camonica, with an ox-drawn square-bodied wagon shown on each. The two Valtellina vehicles are more sketchy, but appear to have elongated trapeze-shaped bodies approaching the A-frame form, recalling the undated rock-paintings of travois and spoked wheel vehicles in the Sierra Morena and Peñalsordo area in Spain (Almagro, 1966). The Val Camonica rock carvings take the story of wheeled vehicles into later prehistory, as do the surviving disc wheels from the Castione and Mercurago terremare sites, or those of northern Europe such as the four from Glum near Oldenburg, with C-14 dates of *c.* 1500 BC (Hayen, 1972). The one British tripartite wheel, from Blair Drummond in Perthshire, is undated; two from Doogarymore in Ireland are *c.* 450 BC, and the type survived into modern times here and in North Britain (Lucas, 1972; Piggott, 1957), but there is no evidence for wheeled transport in early prehistoric contexts in Britain comparable with that just described.

Our brief survey of the first phase of vehicle usage in prehistoric Europe, marked by the making of disc or tripartite disc wheels, allows us to make at least two significant observations. In the first place, such vehicles are adopted and constructed by a whole series of otherwise unrelated communities or societies – the early Mesopotamian urban and literate states, the Kura-Araxes communities, those in south Russia named from the Pit and Catacomb graves; in East and Central Europe in Baden and other contexts defined ambiguously by little more than pottery styles but dignified by the name of ‘cultures’; communities contemporary at least with Corded Ware pots in the north; the makers of the north Italian stelai. And perhaps no less interesting are areas of non-adoption, of which the British Isles seems to be one. We are seeing the acceptance and adoption of a technological increment which could be profitably used to augment the potential of a wide range of agricultural societies among whom good carpentry with stone or metal tools was already an established skill, and we need not look, as some have done, for ‘folk movements’ or ‘Indo-European migrations’. The second, and perhaps more surprising result to emerge is that whether we use our radiocarbon dates in direct or calibrated form, they demonstrate without doubt the virtual synchronicity, within a few centuries, of this technological novelty from Sumer to Switzerland; in calibrated terms between

about 3000 and 2500 BC. The Bronocice representation may indeed indicate chronological priority, before 3000 BC, in the Polish TRB culture. And, as Childe saw on the evidence available to him, it is not only the use of the simple disc wheel which links one area of adoption with another, but the technological ingenuity of the tripartite disc, now rather startlingly attested not only in south Russia in the middle, but Switzerland at the very beginning of the third millennium.

Of Childe's postulates, vehicle burial in graves princely or poor can at best be tentatively suggested as far as east-central Europe, but not beyond to the north and west; the use of metal tools for carpentry in the third millennium has the same limitations. We are left with his basic concept, that of 'diffusion' in a generally east to west direction. I must return to this when we have examined the question of the spoked wheel and the chariot, but I would suggest that the chronological closeness of dates renders independent invention in diverse societies over 40 degrees of longitude (at about latitude 45°N) in five centuries improbable, and that we can also, as did Childe, point to tripartite disc wheels in the contemporary Indus Culture 3000 km east of Mesopotamia. Whether 'diffusion' is an apt term for the phenomenon we seem to be witnessing is another matter – 'technological explosion' may be more appropriate. And for an historically dated example of a not irrelevant distribution I draw your attention to the acquisition of the imported European horse as a means of transport among the indigenous population of the Americas, between its introduction by the Spanish from c. AD 1500 in the Caribbean to its use by Indians over 4000 km to the north, in Montana and Calgary, before 1800; a process covering three centuries (Driver and Massey, 1957: 284).

The horse appropriately leads us to the second part of my survey, the adoption in Western Asia and Europe of vehicles drawn not by bovids, but equids. This is not the place to discuss the earliest domestication of *Equus caballus* (with 64 chromosomes) from a wild ancestor akin to *Equus przewalskii* (with 66) (Bökönyi, 1974: 230; Short, 1975), beyond noting the south Russian evidence for such domestication (with bit cheek-pieces) as at Dereivka in a Sredny Stog context and a radiocarbon date of c. 4300 BC (Telegin, 1971): the date has been called in question (Bökönyi *et al.*, 1973) but must at least lie early in the fourth millennium and is now supported by recently reported finds of horse bones of this date from three sites in Anatolia (J. Mellaart *in litt.*). The horse certainly seems to have been known in Sumer by the mid third millennium BC, and by the second millennium we enter the familiar if controversial field of the development of the chariot in the ancient Near East, to say nothing of its use in Shang China and Vedic India, as well as its appearance in the Caucasus and the southern Urals on the one hand, and the Aegean and continental Europe on the other. Before turning to these instances, it is worth while considering certain points of technology.

Childe (1954b, 214) pointed the way in a prescient sentence I have already quoted – 'Though naturally an expression of the wheel idea, the spoked wheel was a new invention rather than a modification of the tripartite disc'. I would go further,

and suggest that the horse-drawn light cart or chariot was as a whole a new invention, and that the new factor involved was speed provided by a new motive force, which in the instance of the small horses of antiquity could only be exploited by a combination of lightness and resilience of a new kind. To adopt a concept from structural engineering, the disc-wheeled ox-wagon might be seen as a slow, heavy, timber-built compression structure, and the chariot as a fast, light wood structure, largely in tension with its bent-wood felloes and frame (cf. Gordon, 1978; 145). Speed for human transport on land was suddenly multiplied by something like 10 – from the 3.7 km (2 miles) an hour for ox-transport to the 38 km (20 miles) an hour reached with ease with a modern replica of an ancient Egyptian chariot with a pair of ponies, the chariot itself with its harness weighing only 34 kg (75 lbs) (Spruytte, 1977). Any theoretical place or places of origin for this new machine should then combine the availability of domesticated horses with suitable flexible wood supplies, and perhaps a tradition of bent-wood construction in other structures such as dwellings, and an already established familiarity with heavy ox-drawn vehicles.

So far as the Ancient East is concerned, the new work of Mary Littauer and Joost Crouwel makes a strong case for the initial development of the light horse-drawn chariot in an area including north-west Syria and south-east Turkey around 2000 BC. The Hurrians, linguistically affiliated to the Urartian area of Armenian Transcaucasia, and the Mitanni with Indo-European elements in their vocabulary, including technical terms used in horse-training, have been seen as playing an important part in this technology later in the second millennium. I now suggest that the Turkish-Syrian centre just referred to might itself be seen as a part of a larger area, stretching to the north and east, in which less sophisticated forms of light, horse-drawn, spoked-wheel and probably bent-wood vehicles were being experimented with on the steppe and its fringes from the early second millennium BC (Piggott, 1978).

We may begin by returning to the vehicle-burials of c. 1500 BC at Lchashen on Lake Sevan. Here there are not only bronze models of chariots with 6 or 8 spoked wheels holding a couple of warriors, broadly comparable with contemporary Near Eastern types, but the surviving remains of lightly framed vehicles floored with leather straps and open in front, with wheels having two-piece bent-wood felloes nearly a metre in diameter and no less than 28 spokes, features paralleled in Chinese chariots from Shang times onwards and in the mid-fifth century BC carriage from Pazyryk in the Altai, but not in the west (Piggott, 1974). The Caucasian evidence is amplified by the undated but probably second millennium rock carvings as at Syunik in Russian Armenia, (Littauer, 1977) and in the first millennium engravings on bronze belt-plates from the same region, one of which depicts quadrigae with four horses under a single yoke. The depictions of Urartian war-chariots, again in this area, from the eighth century BC, appear incidentally to show wheels not with narrow bent-wood felloes but with the broad felloe construction characteristic of contemporary Assyria, to which I shall return later.



To the north of the Black Sea and the Caspian, roughly from the Dniepr to the Ural, the Pit Grave culture of the third millennium BC was succeeded by that of the Timber Graves, with often elaborate wooden chambers and roofed graves; eastward again the Andronovo culture forms its counterpart to the Irtysh and the Yenisei. As we saw, disc-wheeled vehicles were in use from Pit Grave times onwards in the west of this huge area at least; fourth millennium horse domestication is attested in the Ukraine, and there is abundant evidence in Timber Grave contexts in the form of characteristic bone and antler cheek-pieces of bits. Radiocarbon dates range from *c.* 1900 to 1200 BC for Timber Graves, *c.* 1700 to 1550 for later Andronovo (Piggott, 1975). Evidence for light spoked two-wheeled vehicles are now available from two sites. The first, from near Saratov on the Volga, is a characteristic pot from a Timber Grave burial incised with a schematic vehicle with two four-spoked wheels: one draught animal is shown, of uncertain species. While the four spokes may be taken at face value, they (and their counterparts in rock carvings) may also be a convention for a wheel with any number of spokes, but however interpreted, a light two-wheeler is clearly indicated (Galkin, 1977). On the Sintashta River in the southern Urals a cemetery of early Timber Grave or Andronovo date is more informative, for of the 39 burials in timber-framed and roofed pit-graves excavated, five were cart- or chariot-graves in which light two-wheeled wooden vehicles had been buried. The wheels, 0.9 to 1.0 m in diameter, had 10 spokes and were of such light scantling, with felloes and spokes, traceable as soil replacement features, no more than 4.5 cm in diameter, that bent-wood construction is inevitable. The wheels were accommodated by a pair of pits or slots in the floor of the grave, as in Shang China or La Tène France, with a gauge of about 1.2 m (Piggott, 1975; Gening, 1977). Other details of construction are lacking, and no horses seem to have been buried in the position of draught, though many skeletons were found in the grave fillings above the collapsed roofing, as well as hide-burials of skulls and lower limb-bones. The foregoing evidence, coupled with rock carvings of chariots from Karatau and other areas east of the Aral Sea, led me to suggest recently that perhaps we should look to the Timber Grave – Andronovo continuum, rather than to the ancient Near East in the second millennium BC, as the source from which both Shang China and Vedic India derived their own versions of chariotry (Piggott, 1978).

Westward of the south Russian steppe, in Transylvania and the Carpathian Ring, evidence for domesticated horses goes back at least to the third millennium BC in Zók and Bell Beaker contexts, and Böyönyi has noted that in the Töszeg stratigraphy the earlier (Bronze II – Hatvan) animals are ‘steppe horses with narrow hooves’; the later (Bronze III – Füzesabony) showing local modifications, with broad hooves, in parallel with Timber Grave horses (Bökönyi, 1974: 242). Links between the two areas in harness equipment such as cheek-pieces have been pointed out by several scholars in recent years (Hüttel, 1977): despite the potentialities of the Hungarian Bronze Age ‘tells’ for C-14 dating, we have only two dates, for Bronze I (Nágyrev) at Baracs of *c.* 2200 BC and for Bronze III at Kosziderpadlás of *c.* 1600 BC (Boná,

1975: 77; Vogel and Waterbolk, 1963: 190). Spoked, rather than disc or tripartite wheel models first appear in Bronze III – Ottomani contexts in Hungary and the equivalent Větersov-Mad'arovce levels in Slovakia, but no models survive to show whether these related to two or four wheeled vehicles (Tihelka, 1954). But in the later Piliny phase, likely to be in the fourteenth century BC, representations of vehicles with two four-spoked wheels drawn by horses appear at Vel'ke Raškovce in Slovakia (Vizdal, 1972). All this evidence for horse-drawn, spoked-wheel vehicles and presumptive chariotry in second millennium east Europe is bound up with the still controversial questions of contacts with the Mycenaean world, expressed particularly in certain ornamental motifs; for the protagonists of such contacts, anything that could be interpreted as chariotry would derive from the Aegean. On the other hand, for those of us who are now not so happy about the connection, the continental European evidence, especially in Timber Grave contexts, could favour indigenous developments at the westward end of the steppe-lands. Joost Crouwel recently put up a good case for deriving Mycenaean chariotry from the Levant in a paper to the Mycenaean Seminar of the Institute of Classical Studies in March 1978, but the early domestication of the horse, and Hittite chariotry itself in Asia Minor, surely makes it possible that both sides of the Black Sea could have formed part of a larger area in which early experiments with light spoke-wheeled, horse-drawn vehicles were taking place. The world of Near Eastern chariotry has recently been described as a 'technological *koine*' (Zaccagnini, 1977), a phrase which, in enlarged geographical terms, could aptly be applied to the regions of prehistoric Europe just discussed, from Slovakia to the Urals.

South Scandinavia throughout later prehistory maintained curiously direct contacts with the Lower Danube and Black Sea area – the first copper objects in early fourth millennium TRB contexts; bronze implement types and ornamental motifs in the second millennium; Gundestrup and other metal work in the late first. The second millennium contacts include bronze models of vehicles with light four-spoked wheels, and models of horses, such as Trundholm in Denmark and Hälsingborg in Sweden in Montelius III, or the wheeled cauldron and carriage from Skallerup and Ystad in Period III, with their Central European ancestry in the Milavec model of Bronze D. The stylistic background of the Trundholm horse has been seen convincingly in the Kličevac – Duplaja figurines and wheeled models of Serbia contemporary with the Kosider phase at the end of Hungarian Bronze III. The Scandinavian evidence is amplified by rock carvings such as Kivik, Bohuslän or Frännarp in Sweden, and Östfold in Norway, all of chariots (Marstrand, 1963).

In western Europe, northern Italy has produced sporadic finds such as the little wooden model wheel with 8 spokes from Barche di Solferino on Lake Garda, of Polada date in the earlier second millennium, and the well-known and probably contemporary wheel, 88 cm in diameter from Mercurago in Piedmont (Barfield, 1971), of the 'cross-bar' type recently established as a form with origins in the ancient Near East, represented also in Iberia in the Sierra Morena rock-paintings already

mentioned, and surviving there into the Iron Age and indeed to modern times (Littauer and Crouwel, 1977). Its Italian story is continued with Etruscan depictions from the sixth century BC, and in Greece, as Helen Lorimer showed 75 years ago, it appears on carts but not on chariots in vase paintings from the same time, the Greek chariot continuing to be shown with a four-spoked wheel in an ultimately Mycenaean manner.

Once within Urnfield times, from the beginning of the first millennium, the use of wheeled and probably spoked-wheel vehicles, wagons, carts and chariots, must have been widespread over most of continental Europe, though it must be repeated that for Britain the earliest evidence is still that implicit in finds of the Heathery Burn type at the end of the seventh century BC, reflecting continental Urnfield traditions, from the bronze-sheathed, four-spoked wheels at at Hart-an-der-Alz in early Hallstatt A, and implicit in other pyre-graves (Müller-Karpe, 1956), and the specialised Rhone series with bronze sheathing and composite plank felloes recently studied by Hundt and assigned to the very end of Hallstatt B, and showing Mediterranean influences in their bronze-casting techniques (Hundt and Ankner, 1969).

The wagon (or carriage) graves of Hallstatt C and D, and the cart (or chariot) graves of La Tène have yielded a huge mass of evidence still awaiting detailed technological studies. While perhaps not strictly germane in our enquiry into the *first* carts and wagons, they merit a technological footnote to what we have observed of the wheelwright's craft over earlier periods. In the first place, we must remember that disc and tripartite disc wheeled vehicles never became extinct, as a good dated series shows. Next, despite the social phenomenon whereby chariots replaced carriages as prestige vehicles for the grave from the fifth century BC, there is no reason to think that they vanished from use in the intervening centuries after the second millennium, and their presence as early as Hallstatt C is shown in several graves in Czechoslovakia and Switzerland as well as in one of the Atenica princely graves in Serbia with Greek imports of about 500 BC (Dvořák, 1938; Drack, 1958; Djuknic and Jovanović, 1966). The Iberian evidence for chariots on the grave stelai of the late eighth and early seventh centuries BC is exceptional, linked by other evidence such as V-notch shields and elbow fibulae to Levantine and probably Cypriot contacts (Almagro, 1966; Powell, 1976).

But Kossack (1971) pointed to an important technological distinction in the felloe construction of Hallstatt wheels (from as early as Ha C at Hradenin), and those of La Tène: the Hallstatt series involved massive board or plank felloes of composite woodwork held by metal clamps, while those of La Tène had one-piece, bent-wood felloes with a single clamp over a scarf joint. For the Hallstatt type he looked to Assyria and Cyprus in the late eighth – early seventh centuries BC for technological inspiration, and we have seen the high antiquity of the bent-wood felloe in prehistoric Europe at large. If the Assyrian and Levantine world is involved, the elaborate felloe construction could take its place with other eastern elements in continental Hallstatt and La Tène which need not have arrived via orientalizing Greece – silk and domestic poultry, double-pointed iron ingots and chain mail for instance. The



segmental felloe of medieval and modern wheels we now know, from a C-14 dated find in the Barnstorfer Moor near Oldenburg, to go back to c. 1500 BC (Hayen, 1978), and in Britain, from Holme Pierrepont about the mid second century BC (Musty and MacCormick, 1973). The La Tène wheelwrights introduced a further technological refinement, in the application of the iron hoop tyres which had been current since Hallstatt C in the seventh century BC. Hallstatt tyres were nailed on to the massive plank felloes by nails up to 8 or 10 cm long, usually about a dozen to a wheel. Early La Tène graves have more slender tyres as befits the bent-wood felloe, sometimes, as at Dürrnberg, with up to 25 or 30 nails, but in the Rhineland more often about 8 or so, moving to the fifth century Marne graves with for instance 6 at Somme Bionne and only 4 at La Gorge Meillet (cf. Haffner, 1976: 33). Probably by the fourth century, at La Courte in Belgium, a continuous one-piece hoop tyre, shrunk on red-hot and needing no nails at all had been achieved (Mariën, 1961: 52), to continue throughout the Celtic world – La Tène itself, Kappel, Djebjerg, later Rhenish chariot-graves and those in Yorkshire, Llyn Cerrig Bach, Holme Pierrepont (with segmental fellow) and finally into the Roman period as at Bar Hill or Newsstead, on native vehicles still with the traditional bent-wood fellow (cf. Piggott, 1965: 244, 265).

And here we must stop, and review Childe's thesis after a quarter-century. Have we a demonstration of 'diffusion' in his terms? If we mean the adoption of a technological novelty by a society or societies from outside sources, surely the answer must be 'yes': Switzerland and Sumer can hardly have invented, independently and simultaneously, the tripartite disc wheel around 3000 BC. Childe looked specifically to the early literate civilizations of West Asia for a restricted point of origin for both disc and spoked wheeled vehicles throughout the Old World. I would extend the 'technological *koine*' to a larger area of which the ancient Near East was a south-western component, but as far as Europe is concerned some sort of priority must be given to the east rather than the west, just as at an earlier date the adoption of agriculture or of copper metallurgy shows a similar pattern. The new technology of the first vehicles is a rapid adoption of a novel transport mechanism among communities of diverse cultural traditions, and I compared the spread of the horse in the Americas, but a European phenomenon not far removed in time, the adoption of Bell Beaker pottery and its concurrent copper-working, is perhaps even more apposite in speed and range. Childe's minor postulates can now hardly survive: metal tools are not a prerequisite for wheels, and vehicle burials seem to occur in many societies whose prestige economies are fortified by the display and disposal of expensive status symbols in funeral rites. Unlike the world-wide logboat or skinboat, travois or sledge, the wheeled vehicle for land transport seems to be a limited and specialised Old World invention, closely related to ox-draught and plough-agriculture. As such, it would not be surprising if evidence suggested a restricted area of initial experiment and development, with subsequent rapid adoption among communities with a similar agrarian background. And this is where I think the evidence does direct us today, as it did Childe twenty-five years ago.

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# Rescue Archaeology in Sussex, 1978 – A Fifth Progress Report on the Sussex Archaeological Field Unit

by Peter Drewett (Ed.), Owen Bedwin, David Freke, David Rudling, Daryl Garton and Peter E. Leach

## Introduction (Fig. 1)

During 1978 the Sussex Archaeological Field Unit continued its policy of selecting sites for excavation which fit into four previously defined research projects (Drewett, 1977b). Four sites, Barkhale, Selveston, Black Patch and the Neolithic site on Bullock Down, were selected as part of the Neolithic and Bronze Age Settlement Project. Two excavations, Heathy Brow and Chidham, together with a watching brief at Belle Tout were selected for the pre-Roman Iron Age Project. The Neolithic site at Bullock Down, together with the Iron Age site on Heathy Brow, were also part of the Bullock Down Multiperiod Project. An additional part of this project was the continued excavation of the Romano-British site on Frost Hill. Little work was undertaken within the Urban Project, as David Freke was completing the analysis of the Hartfield pottery kiln material during the year (Drewett, 1978). Trial excavations were, however, undertaken in Brighton and Tarring.

In accordance with S.A.F.U.'s policy, all threatened sites which do not fit into the predefined projects are given extra scrutiny at the planning stage. Such sites are only excavated if a special case can be made for their importance. Two sites fitted into this category during 1978. These were an unploughed Early Mesolithic flint knapping floor at Rackham, and the waterlogged site of a Medieval mill at Batsford, both being the first examples of their type to be excavated in Sussex.

The work was once again carried out by the Unit's three full time field staff, together with David Rudling, Daryl Garton and Peter Leach, three students at the Institute of Archaeology.

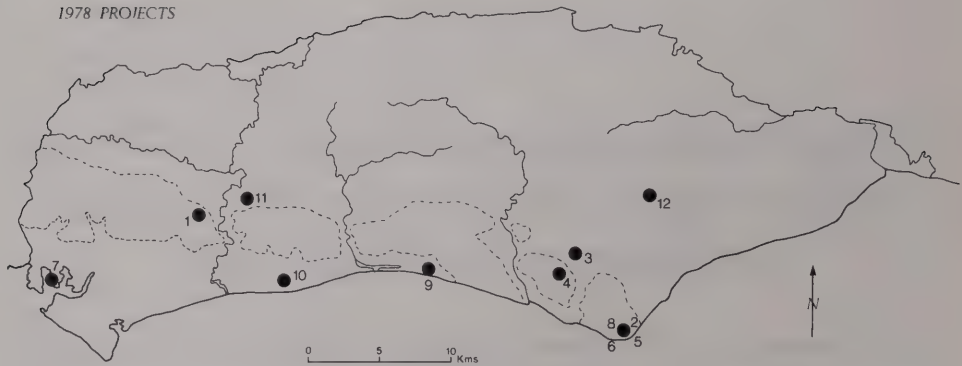


Fig. 1 Projects undertaken by the Sussex Archaeological Field Unit, 1978. 1, Barkhale; 2, Bullock Down Neolithic site; 3, Selmeston; 4, Black Patch; 5, Heathy Brow; 6, Belle Tout; 7, Chidham; 8, Frost Hill; 9, Brighton; 10, Tarring; 11, Rackham; 12, Batsford Mill.

## NEOLITHIC AND BRONZE AGE SETTLEMENT PROJECT

### I. Excavation at the Neolithic Causewayed Enclosure at Barkhale, West Sussex

by PETER E. LEACH

Excavations took place for two weeks in this Causewayed Enclosure on Bignor Down (SU 976 127) on the suggestion of F. G. Aldsworth, West Sussex County Council Archaeology Officer, and at the invitation of the National Trust, owners of the site. The purpose of the excavation was to investigate mounds within the southern segment of the enclosure prior to clearance of scrub and possible levelling, and to establish the precise line of bank and ditch on its perimeter. Earlier excavations, largely in the northern segment, were undertaken in 1930 and 1958 to 1961 (Clipson, 1976).

Trenches were excavated through five mounds and one hollow within the enclosure, and through the perimeter in two places (Fig. 2). The first mound excavated, No. I, consisted of topsoil on a soil of clayey consistency. This overlaid natural chalk, and a pocket of natural clay-with-flints with conical solution holes in the chalk below. The other mounds, Nos. III, IV, V, and VI, showed fewer layers, in some cases the topsoil extended down to natural chalk. Trench III had an oak hole in good condition, lying well below the surface, and Trench V contained a burnt layer, approximately halfway down to the chalk. Although struck flint was found at all levels in the mounds, it is probable that, as they consist largely of topsoil of unknown provenance, they are recent. Trench VII, across a shallow hollow, disclosed only a thin layer of topsoil on natural chalk.



# BARKHALE CAUSEWAYED ENCLOSURE

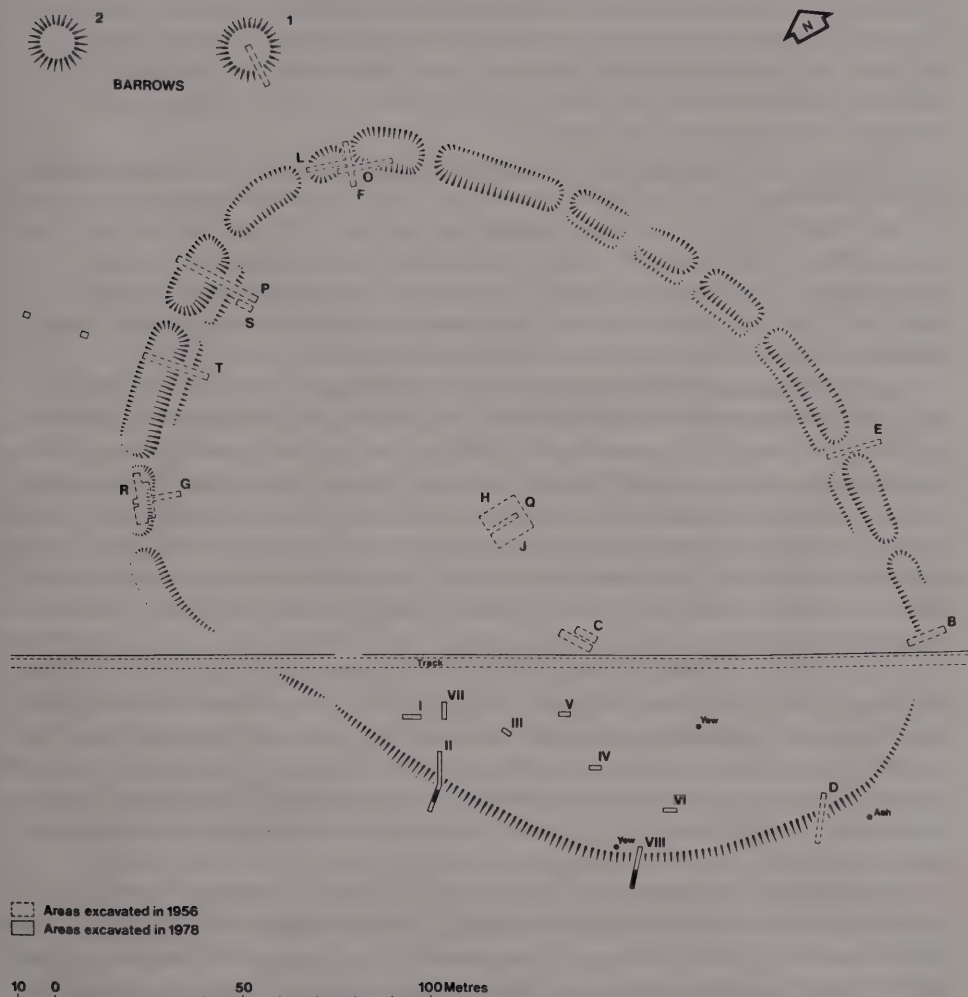


Fig. 2 Barkhale 1978. Plan of earthworks and position of 1958-61 trenches (lettered) and 1978 trenches (numbered). Survey by F. G. Aldsworth.

Trench III on the perimeter extended across bank and ditch. The chalk under the bank showed a preserved rise with what appeared to be periglacial features. The flat bottomed ditch, cut into hard chalk, approximately 2 m wide and 1 m deep, is at the foot of the bank. The bottom of the ditch and the face below the bank showed no weathering, suggesting a rapid silting from the bank.

Trench VIII extended across the ditch, but was not continued beyond the crest of the bank. The natural chalk revealed here was similar to that under the bank in Trench II. It is assumed that a preserved rise in the chalk therefore exists here also. The ditch, cut into what is now shattered chalk towards the bottom, was also flat bottomed, approximately 3 m wide and more than 1 m deep. A berm some 2.5 m wide separated bank and ditch here.

Twelve body sherds of varying colour and coarse fabric with large, angular, calcined flint fragments, together with smaller flint and quartz fragments, were found in Trench VIII (Layer 2 in the ditch). Also found here were two sherds, one with a rim, of somewhat similar but finer fabric without the coarse inclusions. These are all ascribed to the Neolithic because of the rim form (rounded bowl?). One Iron Age sherd, well fired and of fine fabric, and one undecorated Samian sherd, perhaps artificially rounded, were found in the topsoil elsewhere.

Struck flint was found at all levels. Of the 584 struck flints, 88 had been utilised and confirm the Neolithic nature of the site. A possible pit in the shattered bottom of the ditch in Trench VIII contained 122 flakes, some of which fit together. They clearly form an assemblage and are suggestive of flint working within the enclosure. Fire cracked flints totalled 67, but 44 of these came from the burnt layer in the mound at Trench V, and are probably of modern origin. The excavated flint, although considerable in quantity bearing in mind the limited excavation, must represent a very small proportion of that in the total enclosure and cannot be considered in isolation.

Samples for molluscan analysis by Dr. K. Thomas were taken from the lowest three layers of the ditch in Trench II (Layers 2, 3 and 4). No land snails were found in Layer 2, owing perhaps to locally acid soil. Three unidentifiable fragments only were found in Layer 4, due possibly to the rapid silting of this layer. Layer 3 contained snail shells from 23 individuals of shade-loving species. This may be expected in the microhabitat of a ditch, but the absence of open country species is surprising.

The fill of a ditch and the snails found therein should reflect the ditch microenvironment and that surrounding it, producing a 'mixed' assemblage. That found here is very restricted, with no obligate open country species nor shade-loving species, indicative of woodland conditions. The species found have been recorded in long grass habitats on chalk, but usually in association with species indicative of grassland habitats. Neither is the assemblage indicative of scrub, as this would contain microhabitats suitable for shade-loving and open country species and, on chalk, would include *Pomatias elegans*, absent here.

At Offham (Thomas, in Drewett 1977a) somewhat similar assemblages were taken to suggest a temporary clearance in woodland, but the data from Barkhale are too inadequate to support a similar interpretation.

A different possible interpretation here is that of an assemblage wholly representative of a snail fauna living in the sheltered and alkaline conditions of the ditch, with none from elsewhere. This would be most likely to arise if the surrounding soils were too acid to support a thriving community of snails.

A small amount of charcoal of very fragmented *Quercus* sp. (oak) was found in the ditch Layer 2 of Trench VIII.

## II. A field survey of the Neolithic settlement site on Bullock Down, East Sussex

by P. L. DREWETT

During 1978 further areas within the Neolithic site on Bullock Down became available for field walking. The site is being walked on a 30 m grid and Fig. 4 shows the current plot of flint flakes over the four fields examined so far. From this it is clear that the bulk of the flint working took place within the 500 ft contour with up to 160 flakes per 30 m square. In addition to this main cluster were subsidiary clusters spread over all the other fields examined. Field 0647 was examined in detail in January 1978 and the results plotted out on Fig. 4. The fire-cracked flints clearly cluster in two main areas. Excavation of the eastern cluster (see section 5 below) proved it to be of Early Iron Age in date, while the date of the western cluster remains uncertain. In an attempt to isolate areas of primary flint preparation from areas of secondary working, flakes with and without context have been plotted separately (Fig. 4). It is interesting to note the scatter of cores around the concentrations of flakes rather than actually in the squares with the highest density of flakes. This reflects the much more detailed picture of flint knapping from the earlier site at Rackham (Fig. 23). Presumably cores were tossed away, while flakes would simply be allowed to fall to the ground. The distribution of retouched flakes and scrapers around the centres of flint knapping and around the areas of burnt flint may suggest working areas related to the preparation of skins.

The field survey of field 0647 therefore suggests the presence of discrete work areas. The fire-cracked flints probably derive from hearths, although these may be for the preparation of calcined flint for pottery fillers rather than simply domestic hearths. Around these areas are flint knapping floors marked by concentrations of waste flakes encircled by cores. Between these areas are scatters of scrapers and retouched flakes, perhaps suggesting the treatment of skins in discrete areas. Further field walking and detailed plotting in this area will, we hope, isolate more such activity areas in order that we may obtain further details of the economy and organisation of these extensive Neolithic clay-with-flints settlements.



**BULLOCK DOWN**  
NEOLITHIC  
*Surface flake density*

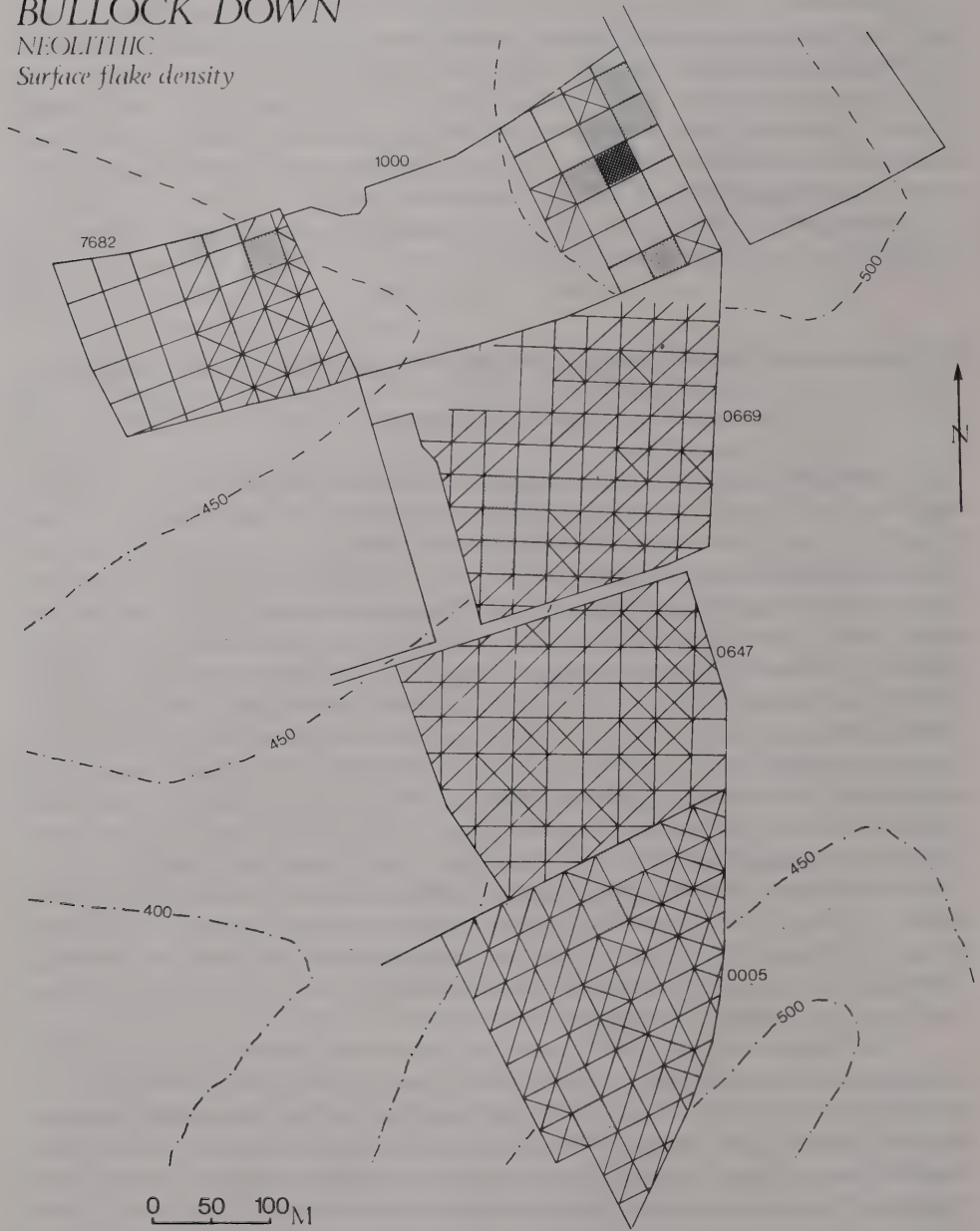


Fig. 3 Bullock Down 1976-78. Plan of flake density over Neolithic settlement site. Graded shading in units of 10 up to 39 flakes per square. Dot shading in units of 30 from 40-160 flakes per square.

NEOLITHIC

Surface flint density

OS 0647

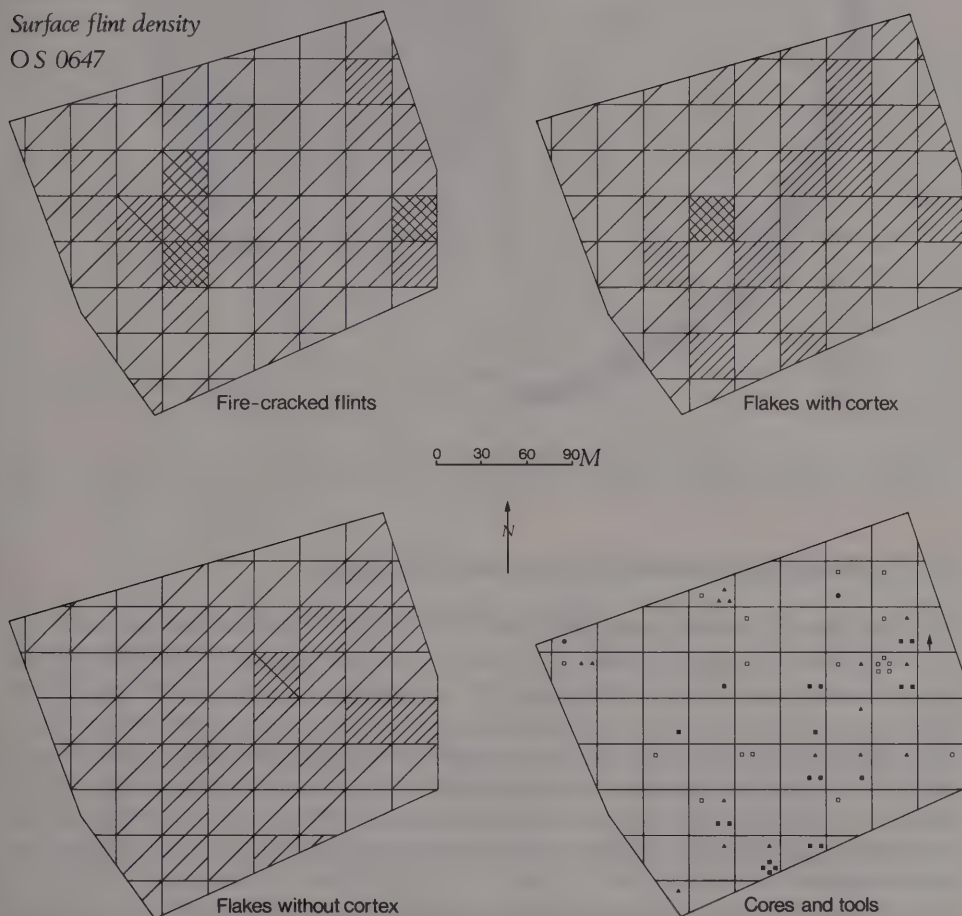


Fig. 4 Bullock Down 1978. Plan of flint distribution over field OS 0647. Fire cracked flints include those relating to the pre-Roman Iron Age settlement. Graded shading in units of 10 per square. Open square: core; open circle: hammerstone; solid triangle: scraper; solid circle: serrated blade; solid square: retouched flake; solid arrow: arrowhead.

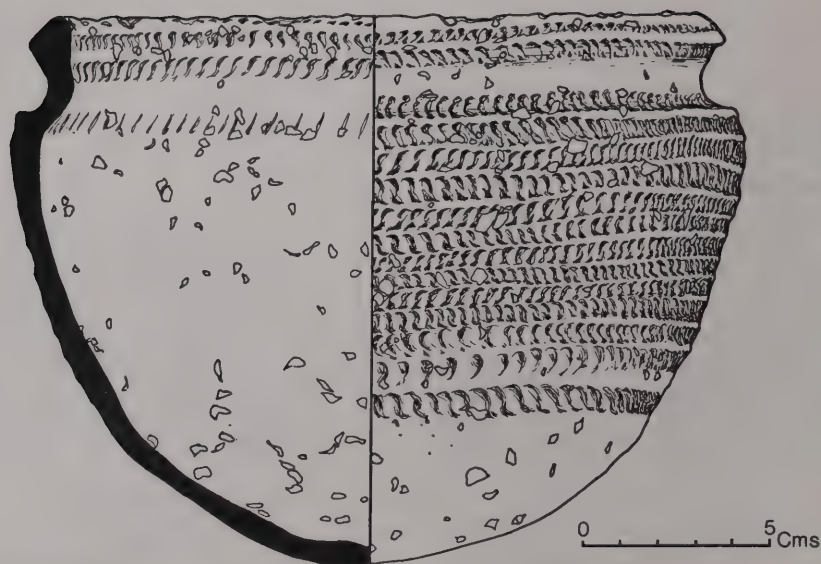


Fig. 5 Selmeston. Neolithic pot found in sand pit face.

### III. Preliminary Excavations at Selmeston, East Sussex

by P. L. DREWETT

In 1974 a Neolithic bowl of Ebbsfleet style was found by John Bell in the eroding face of the sandpit at Selmeston. This bowl (Fig. 5) was recovered some 100 m to the east of the Mesolithic hollows excavated in 1933. Several sherds of Peterborough style pottery were found in the upper fill of these pits (Clark, 1934). These finds all suggest the existence of an extensive Neolithic occupation site on the Greensand ridge to the east of Selmeston Church. It was therefore decided to excavate a single trench adjacent to the find spot of the 1974 pot in order to examine its context.

A general scatter of Mesolithic and Neolithic flint flakes was found all over the trench (Fig. 6), but no contemporary features were located. All the features found, gullies, post holes and a dog burial, were sealed beneath a Medieval plough soil (Fig. 6). The presence of large, unabraded sherds of Saxon pottery in the southern half of the trench associated with three post holes indicates the possibility that they are Saxon. The gullies produced a mixture of material, and are likely to be Medieval field boundaries. It is not proposed to continue with these excavations, as the Neolithic settlement has almost certainly been largely quarried away. This area does, however, remain of considerable importance for Saxon and Medieval studies.



SELMESTON

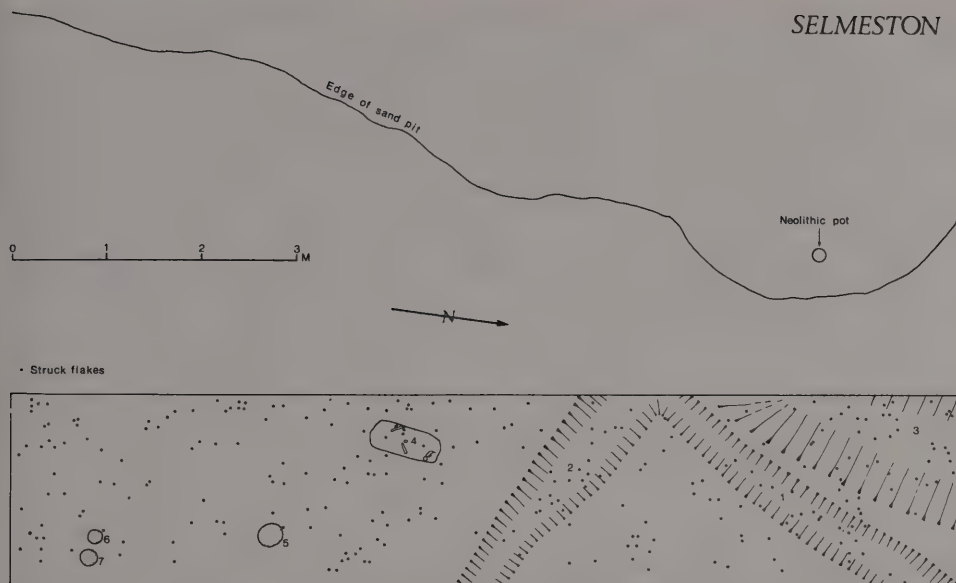


Fig. 6 Selmeston, 1978. Position of Saxon and Medieval features in trench in relation to Neolithic pot found in face of sand pit.

#### IV. The Excavation of a Middle Bronze Age Settlement at Black Patch, Alciston, East Sussex

by P. L. DREWETT

The settlement at Black Patch was discovered by George Holleyman in 1949 (Fig. 7). It consists of four house platforms and seven enclosures set in a network of rectangular fields. Access through the fields was by two double lynchet trackways and a hollow way. Unfortunately, since the site was discovered, it has been largely levelled by continuous ploughing. In the light of a Sussex Plough Damage Survey published in 1976 (Drewett, 1976), the Department of the Environment agreed to fund a preliminary excavation of hut platform 4 in 1977, and its total clearance in 1978. It is now hoped to continue with a more extensive excavation of the settlement, its fields and barrows.

Figure 8 shows the results of the excavation so far. The whole area was excavated by hand, including the plough soil, in order to obtain as full a sample as possible of artifactual, faunal and floral remains. The exact position of all artifacts below the plough soil was recorded (Fig. 9), and extensive flotation of the hut floors and all features was undertaken.

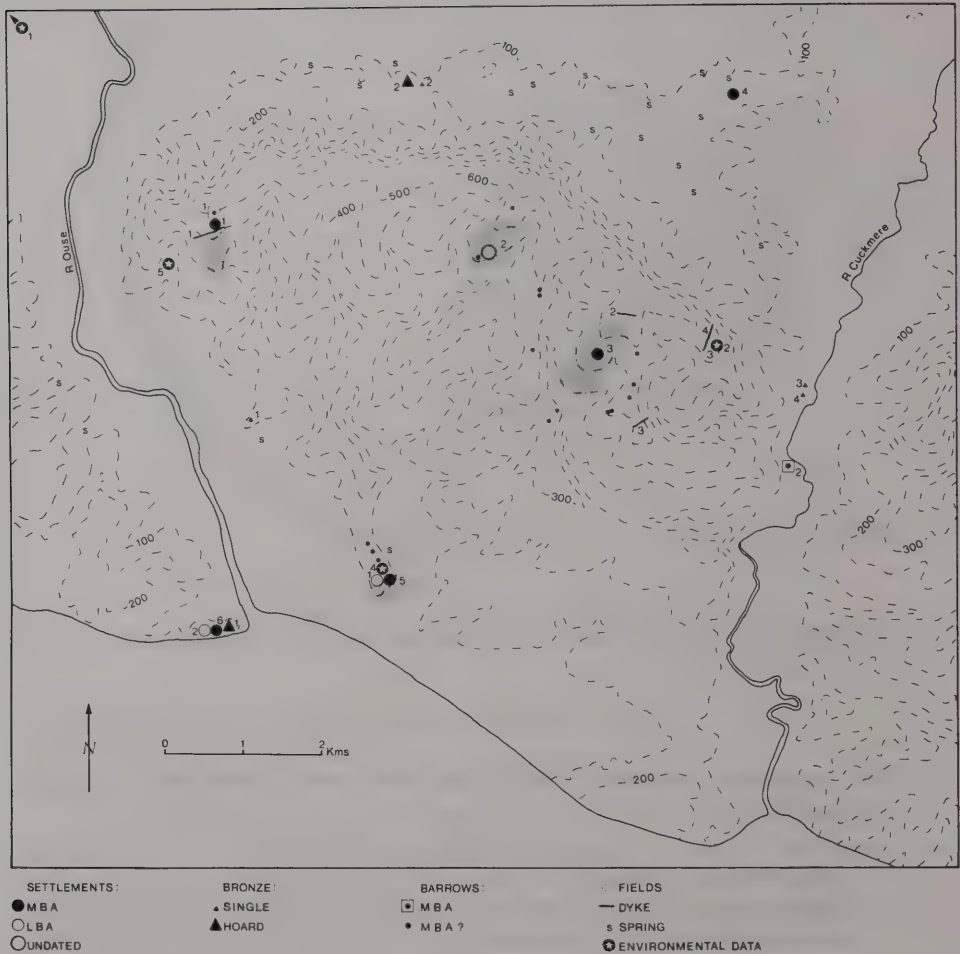


Fig. 7 Black Patch 1978. Location of settlement (No. 3) in relation to other Middle and Late Bronze Age settlements, fields, barrows, and dykes.

The elements of the settlement were remarkably consistent with data from contemporary sites elsewhere on the South Downs. However, the use of bulk water flotation, and the far greater quantity of artifacts (particularly bronzes), has given us a much fuller picture of the economic basis of this type of site than was formerly available. The structural elements of the platform excavated consisted of five terraces cut into the slope of the hill. On each terrace were the post hole remains of at least one round hut.

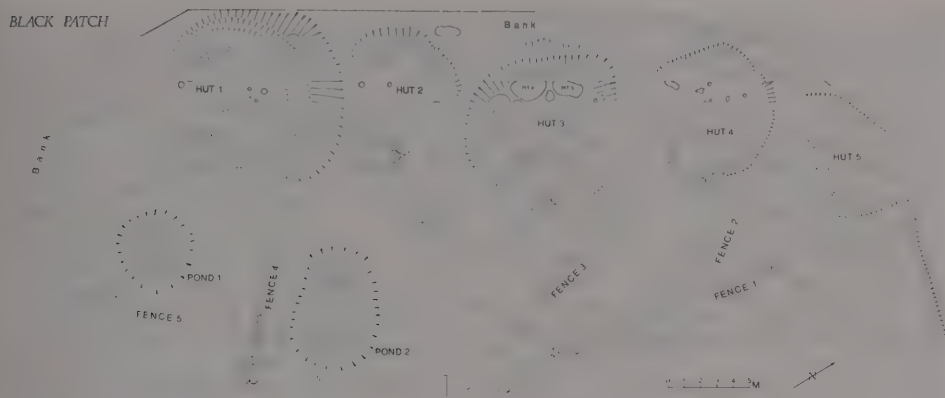


Fig. 8 Black Patch 1978. Plan of hut platform 4.

Hut 3, the central hut in a line of five, is possibly the main living hut, although, as we shall consider later, huts 1 and 4 are probably also living huts, while huts 2 and 5 possibly fulfilled a subsidiary function. Hut 3 consisted of a circular structure some 8 metres in diameter (Plate I). It may best be reconstructed as a substantial hut, roofed to the outer lip of the terrace.

Solution, together with worm sorting, has resulted in the bulk of the artifacts ending up on the present day chalk surface. How much lateral movement there has been since the Bronze Age is an open question, but I suspect on a fairly level terrace it was not much. The spatial distribution of artifacts (e.g. Fig. 9) is therefore probably still meaningful. Hut 3 produced four bronze objects. These consisted of a Class I razor (Fig. 10, No. 1) from pit 3, a tanged triangular blade (Fig. 10, No. 2) and an awl/tracer (Fig. 10, No. 6) from the hut floor, and a second awl/tracer (Fig. 10, No. 7) from the porch post hole. Pottery was scarce in reasonably secure contexts (more coming from animal and plough disturbed upper levels) but does appear to cluster around the edge of the hut, indicating a completely different picture of pot use to that found in hut 1. The loom weights found consisted of three clusters of three and three odd ones against the north-east wall, together with three more in the entrance area. Flint flakes were found scattered fairly evenly over the hut floor. Most of these flakes were fairly large and even wet sieving did not produce many small flakes. This would suggest flint knapping elsewhere, with flakes being brought in deliberately for some specific use. Superficial examination of the Black Patch flint assemblage (consisting of some 24 kilos from Platform 4) shows very few conventional implements. Such implements consist of a few scrapers. All else is what would generally be classed as waste material, i.e. flakes and cores. However, as it appears that flakes were struck outside the huts and then brought inside, it is probable that the flakes themselves



BLACK PATCH  
HUT 3



Fig. 9 Black Patch 1978. Hut 3. Distribution of bronze, pottery, loom weights, flint flakes and fire cracked flints.

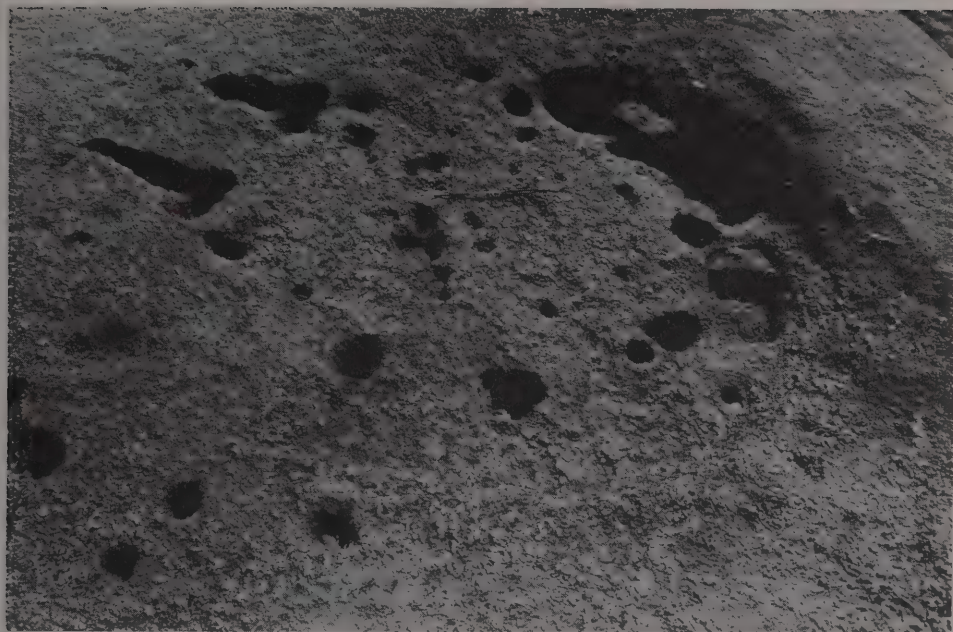


Plate I Black Patch 1978. Hut 3. Scale 2 m. (Photo P. L. Drewett)

were being used, possibly as simple cutting tools. Unfortunately we have no comparative material from Sussex settlements, as previous excavators did not collect anything other than tools with secondary working.

The distribution of fire-cracked flints (Fig. 9) shows two general clusters, one in the entrance area and one in the north corner of the hut. The cluster of fire-cracked flints inside the entrance, a feature repeated in huts 1 and 4, indicates the most likely position for a hearth. The excavators of Itford Hill were certain that the huts on that site did not contain hearths. However, if a small fire was made on the surface of the chalk terrace just inside the entrance, and then 50 cm of chalk dissolved away, all that would survive is a general concentration of burnt flint. This is exactly the feature found in the larger porched huts at Black Patch and, although only mentioned in passing, also at Itford Hill. The second cluster of burnt flint in the north corner of hut 3 cannot be interpreted in this way as a fire in this position would be too close to the junction of roof and floor. This group could be a store of burnt flint awaiting use as a filler in the locally produced pottery.

From the distribution of artifacts it is therefore possible to determine not only a range of activities practised within the hut, but also whereabouts in the hut such activities took place. Assuming the only light entered the hut through the porch from

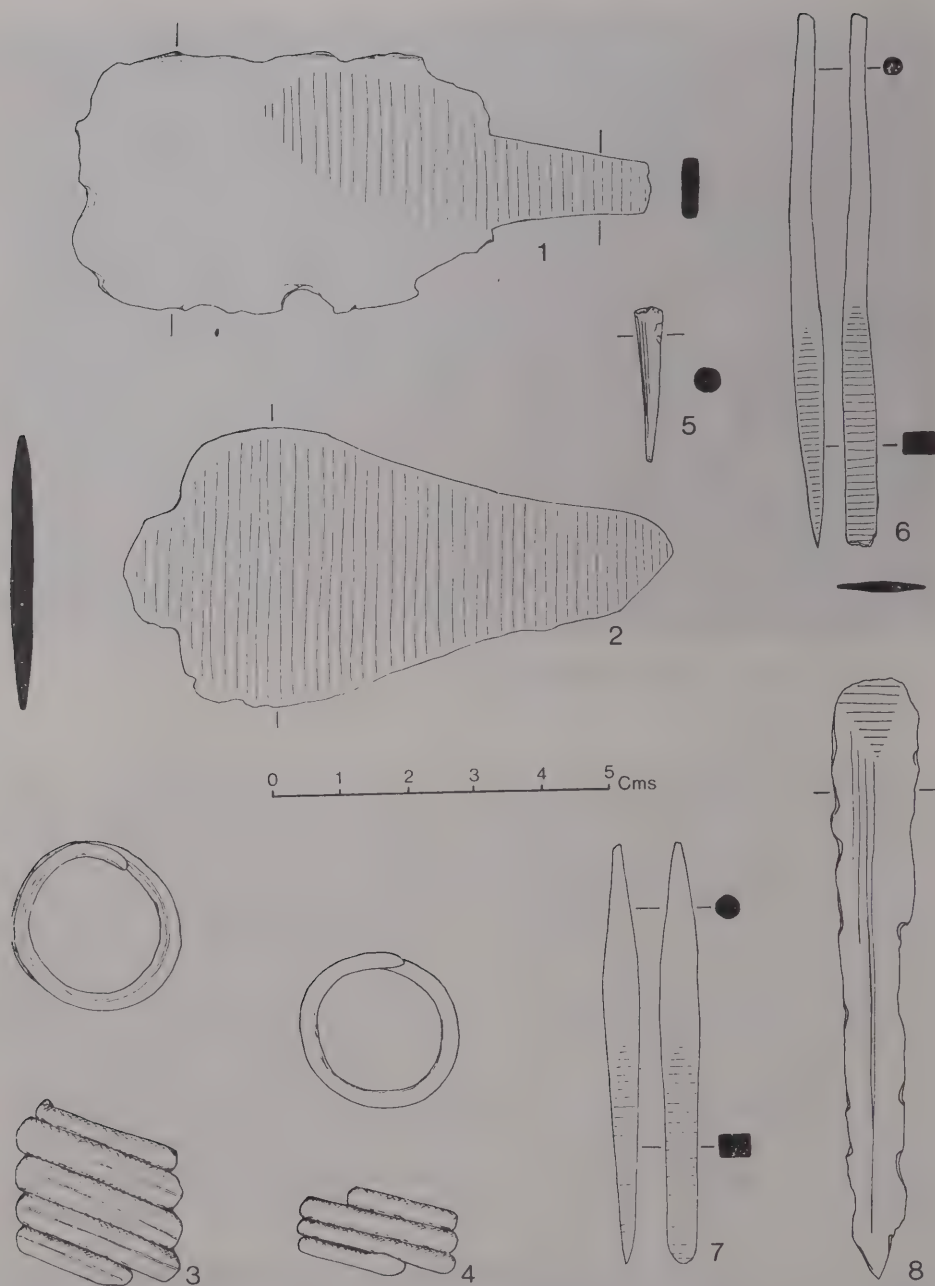


Fig. 10 Black Patch 1978. Bronze objects from hut platform 4.



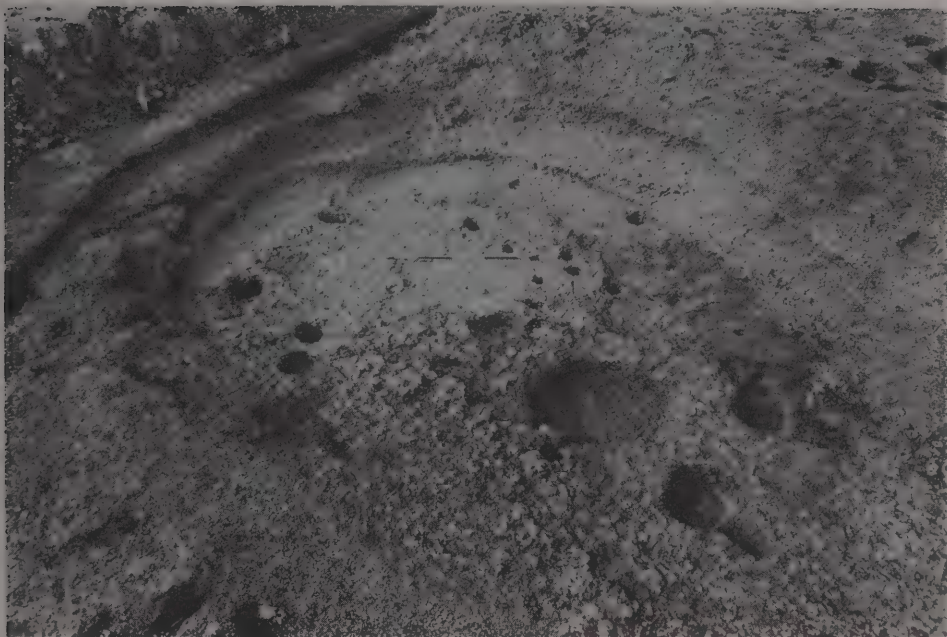


Plate II Black Patch 1978. Hut 1. Scale 2 m. (Photo P. L. Drewett)

the south, then the entrance area and the north wall would be the best lit areas. It is therefore not surprising to find the entrance area and the north side of the hut producing most evidence for craft activities. The loom was probably leaning against the north wall, or lashed to the roof, taking full advantage of light entering. The absence of flakes in the central part of the north wall suggests something preventing their spread in that direction. A vertical loom could have been such a barrier. Inside the entrance, by the fire, the two awls perhaps indicate leather or wood working in this, the best lit area of the hut. The darker recesses of the hut against the west wall were used for storage, as indicated by the line of pits. As all of these contained burnt grain, their use for grain storage is probable. With adequate covering over the pits, this area, and the area to the south-east, is a possible sleeping area. This possibility is underlined by the almost total absence of pottery and burnt flint in the area.

Hut 1 (Plate II) is on the same scale as hut 3, but the artefacts suggest a somewhat different function. This hut showed little evidence for the craft activities evident in hut 3. No complete loom weights or any fragments of awls were found. However, the bulk of the pottery from the whole site was found in the central area of this hut, associated with a scatter of fire-cracked flints, again possibly suggesting a hearth just inside the porch. The one storage pit from this hut most probably



Plate III Black Patch 1978. Fence 3. Scale 2 m. (Photo P. L. Drewett)

post-dates the hut, as it largely blocks the entrance passage. The only bronze from this hut, two spiral finger rings (Fig. 10, Nos. 3 and 4), being ornaments, underline the absence of craft activities in the hut. Food preparation may have been a primary concern in this hut, a possibility supported by the presence of a shattered quern stone.

Hut 4, although smaller than huts 1 and 3, is of particular interest in that it shows a combination of activities present in those two larger structures. The craft activities suggested for hut 3, illustrated by loom weights and a bronze knife (Fig. 10, No. 8) were all present in hut 4. However, a high density of pottery was found just inside the porch, associated with fire-cracked flints as in hut 1. No storage pits were situated in this hut.

Huts 2 and 5 were smaller, simpler structures, built on very slight platforms. Neither produced bronze or very much pottery. Hut 2 contained a substantial number of flint flakes, while hut 5 produced some flakes and more fire-cracked flints. A subsidiary function could be argued for these huts.

Directly associated with the huts were fence lines and ponds (Fig. 8). The relationship of fence lines and ponds to huts may suggest degrees of relationship and independence of the huts one to another. Hut 1 is in its own fenced yard, with its own

water supply (pond 1). However, huts 2 and 3 are situated within a single fenced yard (Plate III), sharing a water supply (pond 2). Hut 4 has its own fenced yard, but no water supply, suggesting a degree of independence, but dependent on an adjacent compound for water. Hut 5, having its own little triangular yard, was probably not a living hut, so perhaps did not require a water supply.

A case can be made that the hut cluster excavated at Black Patch represents a single family unit of father, mother, children and grandparents or reliant sibling. A group of four adults with any number of children is indicated. How many of the children may have been at an age to assist in the work of the unit is naturally uncertain. The Itford Hill unit as indicated by the individuals buried in the barrow, supports the suggestion of a small family group. That barrow contained five adults (two male, two female and one uncertain), four children and three cremations of uncertain age (Holden, 1972).

If we now turn to the economic basis of the farm it is clear that we are dealing with a mixed farming strategy. The content of pit 3, together with bulk flotation of the floor levels within huts and samples from the majority of the post holes, has given us a very clear picture of what was being grown on the farm, together with what wild plants may have been collected or were growing in the farmyard. Although the mass of seeds recovered during 1978 have not yet been fully analysed, the bulk of the grain is barley with some emmer.

Only 77 identifiable fragments of bone were found during the 1978 excavation. Mr. T. P. O'Connor has kindly provided the following identifications:

Species	Fragments No.	%	Minimum numbers	
			No.	%
<i>Bos</i>	49	63.6	4	28.6
<i>Ovis</i>	15	19.5	3	21.4
<i>Sus</i>	2	2.6	2	14.3
<i>Cervus</i>	7	9.1	2	14.3
<i>Oryctolagus</i>	2	2.6	1	7.1
<i>Mus</i>	1	1.3	1	7.1
<i>Aves</i>	1	1.3	1	7.1

The predominance of cattle in the fragments count reflects the greater size of the *Bos* skeleton and thus the larger number of fragments which a single beast may produce on slaughter. Pig is probably over-represented in the minimum numbers as the two small fragments definitely came from two different animals. Probably all that can be safely said regarding the relative importance of the species represented is that cattle and sheep constituted the bulk of the livestock and that deer was a minor but significant component of the food supply. All three species were probably dual purpose: cattle providing milk and traction, sheep wool and milk, and deer antler, so that a mere consideration of meat content will not reflect the true economic situation. The few bones of *Mus* and *Oryctolagus* are almost certainly intrusive.



BLACK PATCH RESOURCES

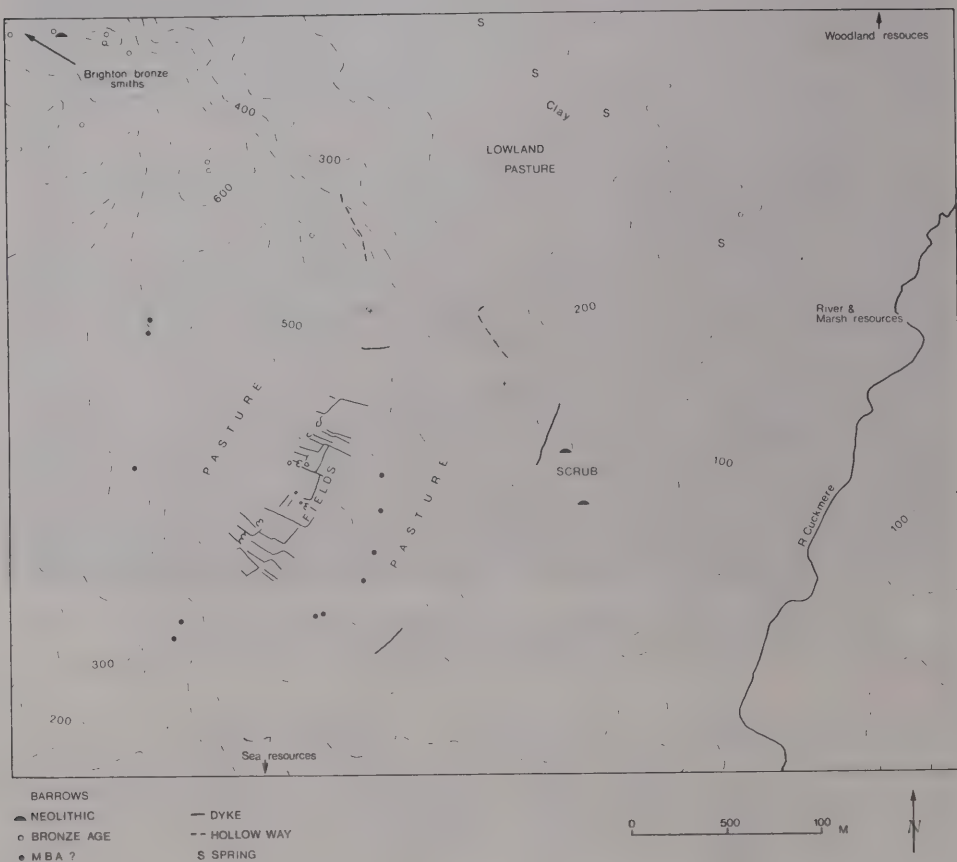


Fig. 11 Black Patch 1978. Resource map.

The only other foodstuff which left any evidence in the archaeological record was represented by a few fragments of mussel shell. Other natural resources utilised were wood and stone. Considerable quantities of wood must have been used in the construction of both the huts and the fence lines. Analysis of the small quantities of charcoal found indicate the extensive use of oak and hawthorn. Apart from flint, the bulk of the utilised stone, mainly quernstones and whetstones, was ferruginous and siliceous sandstone. The ferruginous sandstones probably derive from the Greensand which outcrops to the north, while the siliceous sandstones may well derive from an outlier of the Woolwich and Reading Beds at Newhaven to the south.

If we now consider the territory utilised by the Black Patch farmers, it is clear that we have almost a model farm. Immediately surrounding the huts is a network of small, rectangular fields and enclosures. Until platforms 1, 2 and 3 (Fig. 11) have been excavated, we cannot be certain whether all are contemporary or whether the farmstead developed up or down the hill. It is most likely that the fields (Fig. 11) were not all ploughed at the same time. Future work may help to enlighten this point. A section cut through the eastern side of enclosure 1 in 1978 produced virtually no occupation material, so it is likely that these enclosures were for stock. An area around the fields, perhaps delimited by barrows and dykes (Fig. 11), was most likely permanent pasture. If this was so, there would be the problem of watering the animals, as there are no natural sources of water on the Downs. The most likely solution to this problem was to take the animals, perhaps daily, down to lowland pasture. As the two easiest routes to the River Cuckmere had been blocked by cross-ridge dykes, presumably marking a boundary with an adjacent farm, the animals may well have been taken down the scarp slope to the ample network of springs at the junction with the clay below (Fig. 11). Although impossible to date, it is interesting to note the presence of two deep hollow ways cutting down the scarp slope of the Downs just north of the settlement.

It is probable that the oak trees required for building were obtained from the clay lands to the north of the Downs, as it is unlikely that there was much oak woodland left on this part of the Downs in the Middle Bronze Age. Evidence from the late Neolithic oval barrow adjacent to the eastern cross-ridge dyke indicates open country in the late Neolithic (Thomas in Drewett, 1975). However, molluscan analysis from that same barrow indicated the probability of some scrub cover by the Middle Bronze Age. This being the case, the hawthorn, if not the oak, may have been obtained on the Downs.

The presence of shell fish and siliceous sandstone indicates some contact with the sea shore 4–5 kms to the south. As there is as yet no evidence for bronze working on site, it is possible that the bronze objects themselves were brought onto the farmstead. The south coast craftsmen (Rowlands, 1976: 128), with a clear sub-group in the Brighton area, may have been a source of supply.

## PRE-ROMAN IRON AGE SETTLEMENT PROJECT

### **V. The Excavation of an Iron Age settlement at Heathy Brow, Eastbourne, East Sussex**

by O. R. BEDWIN

This site was excavated as part of both the Iron Age project and the Bullock Down Multiperiod Project. It was originally found by the farmer, Mr E. D. Williams,

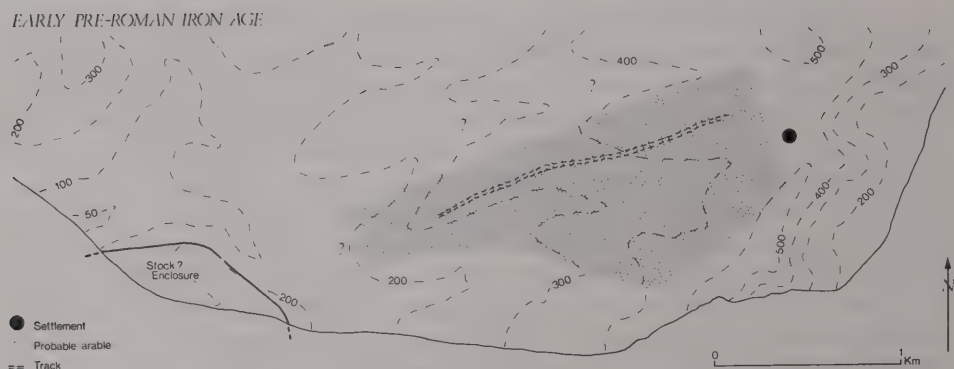


Fig. 12 Bullock Down 1978. Early Iron Age settlement in relation to fields, trackway and stock enclosure at Belle Tout.

and was more precisely defined by field walking in January, 1978 (Fig. 12). The area excavated corresponds to a conspicuous concentration of Iron Age pottery in one corner of the field (Fig. 13).

Ploughsoil was removed by machine; the subsoil, largely clay-with-flints, was then cleaned and features excavated. Two concentrations of burnt flint were found, both containing a great deal of early Iron Age pottery, charcoal, and small sandstone fragments. One of these concentrations was rectangular, 6 m  $\times$  4 m (Fig. 14), the other oval, 5 m across. These are interpreted as hut sites, where the structure of the hut was such as to leave no trace in the subsoil. The area of the hut is thus defined by objects dropped onto, and perhaps trodden into, the floor, to be subsequently worm-sorted down onto the clay-with-flints after the site was abandoned. The survival of these burnt flint concentrations on an annually ploughed site is remarkable.

In addition to these features, there were two clusters of post holes and two shallow, irregular working hollows. One of these hollows was in the centre of the excavated area, the other was largely beneath the eastern edge baulk. Neither of these hollows was more than 30 cm deep. The shallow, unusually-shaped depression, feature 15 (Fig. 13), contained a hard, gritty fill with occasional thin lenses of softer material. In this respect, it closely resembled the working hollows, but its shape suggests a specific, though unknown, function.

Early Iron Age pottery was plentiful, though almost all sherds were small and abraded. Diagnostic sherds correspond to Cunliffe's 'Park Brow-Caesar's Camp' style zone, i.e., centring on the fourth century B.C. (Cunliffe, 1974). No metal objects or bone was found, due to the acidity of the clay-with-flints. Part of a Kimmeridge shale bracelet was found in a post hole, feature 29.



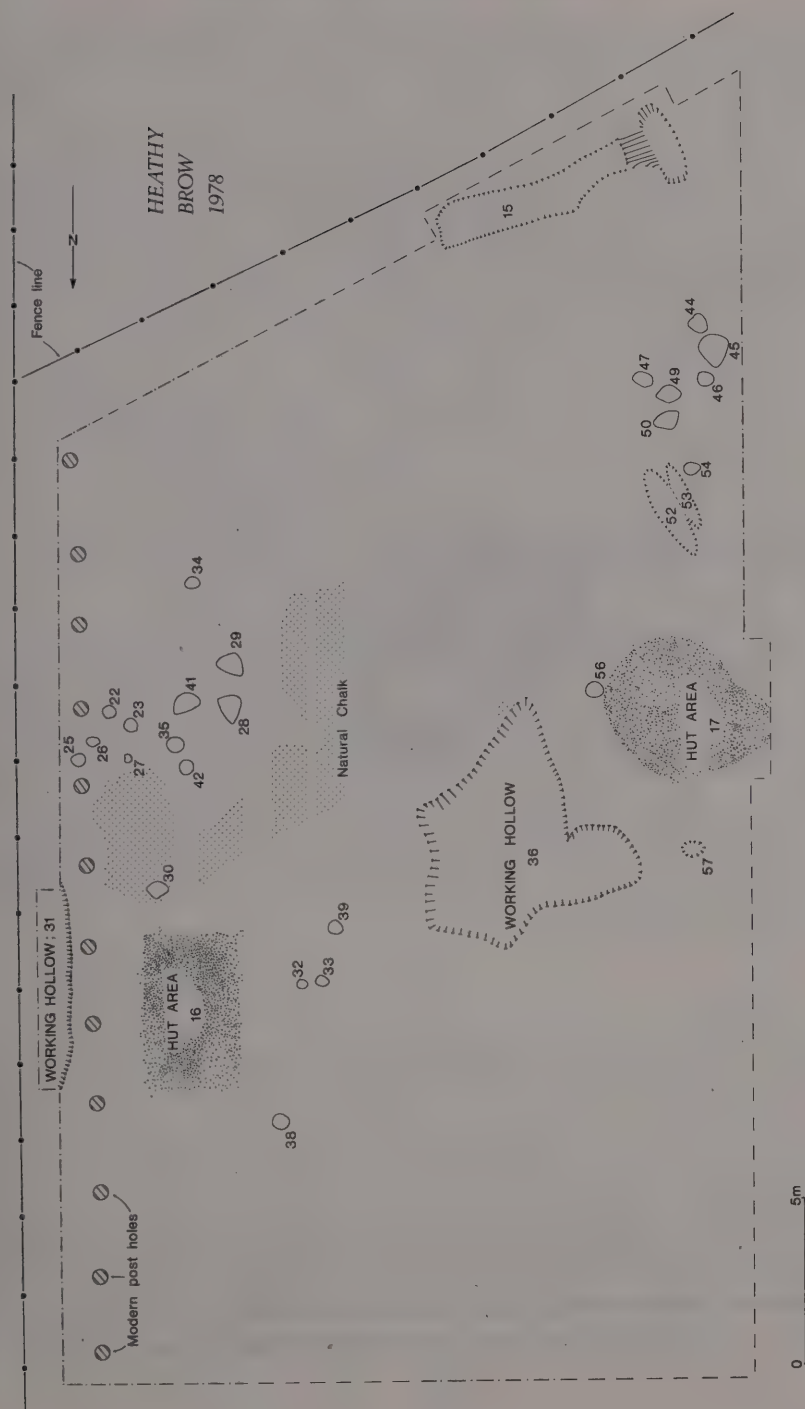


Fig. 13 Bullock Down 1978. Heathy Brow. Plan of Early Iron Age site.

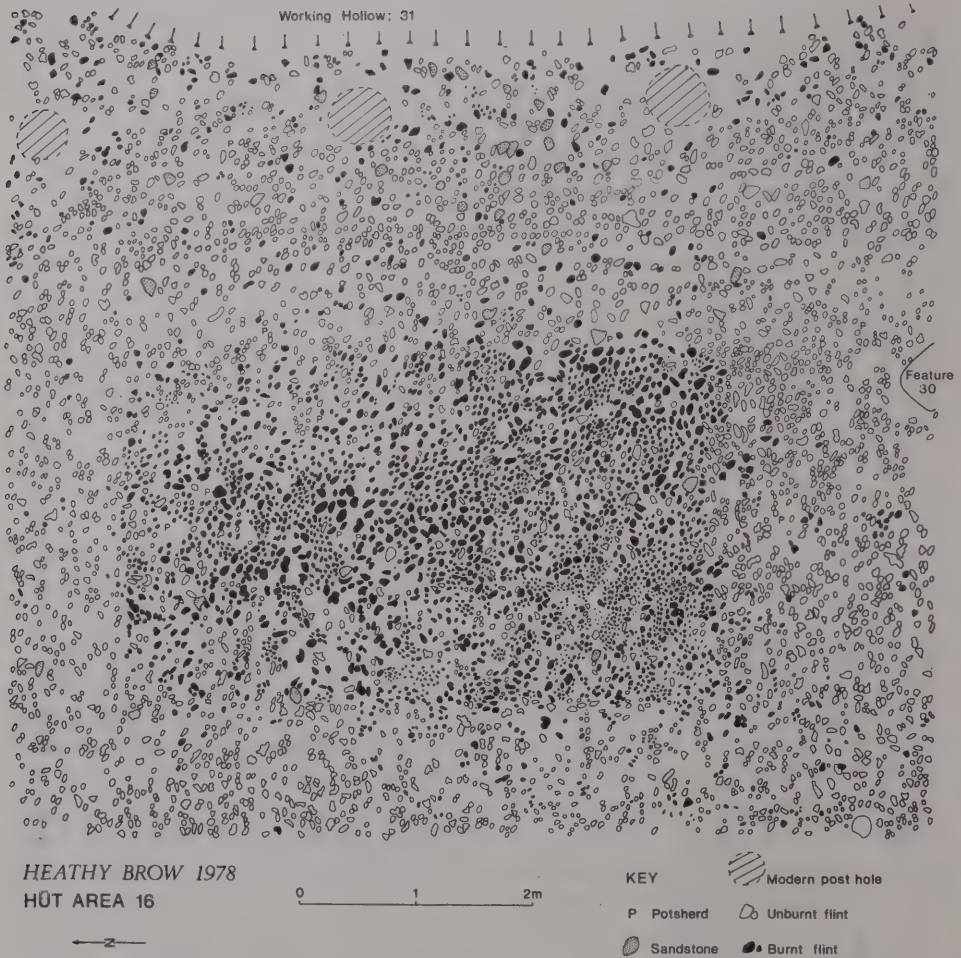


Fig. 14 Bullock Down 1978. Heathy Brow. Detailed plan of rectangular hut site.

The general date range of the site suggests that the settlement on Heathy Brow was broadly contemporary with the nearby enclosure of Belle Tout. Thus it may be possible to identify an early Iron Age unit of land use, comprising Belle Tout (as a cattle enclosure), Heathy Brow, the double lynchet trackway which connects these two, and the Iron Age fields laid out on either side of this trackway (Fig12).

## **VI. A Section through the pre-Roman Iron Age Enclosure at Belle Tout, East Sussex**

by P. L. DREWETT

In September, 1978, Seeboard cut a cable trench from Hodcombe, through the rampart of Belle Tout (Fig. 12) at the east end of the enclosure, to the disused lighthouse. The excavation was observed for most of its duration. No archaeological features were located within the enclosure, confirming the probability that it is a stock enclosure. The bank consisted of about 1 metre of chalk rubble with some brown, friable soil. This appears to have been thrown up from a terrace cut into the hill slope to the north of the bank. No trace of a ditch was located, possibly because of the very steep slope of the hill at this point. No further dating evidence was found within or under the bank.

## **VII. The Excavation of an Iron Age Salt-working Site at Chidham, West Sussex**

by O. R. BEDWIN

Coastal erosion at Chidham has exposed Iron Age pottery, burnt flint, and briquetage in the tidal margin (R. J. Bradley, pers. comm.). The presence of briquetage suggested the existence of a salt-working site. In view of its vulnerability to erosion and the fact that no salt-working site had previously been examined in Sussex, it was decided to undertake its rescue excavation.

The site was situated on a small headland on the west of the Chidham peninsula. Burnt flint and flint-gritted pottery were being continuously eroded from the tidal margin, which was up to 50 cm high, over a distance of about 40 m. One U-shaped feature, clearly rich in both charcoal and pottery, was visible in the tidal margin, and 20 m of the margin was excavated back from the eroding face, centred approximately on this feature (Fig. 15). A narrow baulk was left unexcavated to keep high tides out of the excavated area.

Excavation proceeded by removal of the turf and topsoil, followed by removal of up to 30 cm of featureless overburden, initially by spade and then by trowel. Because of the difficulty in resolving features in the brick-earth subsoil, finds were plotted continuously on the plan (Fig. 15). However, the only feature discovered was that originally exposed in the tidal margin. This proved to be part of a round-ended pit cut 40 cm into the subsoil. The fill of this pit contained much charcoal, little briquetage, and some pottery. The few sherds of briquetage were undecorated and undiagnostic, though the pottery was of early Iron Age date, corresponding to Cunliffe's 'Kimmeridge-Caburn' style zone (Cunliffe, 1974). Given the presence of briquetage and the proximity of the sea, it is likely that this pit was the end of a shallow salt-pan, in which sea water was trapped and evaporated.



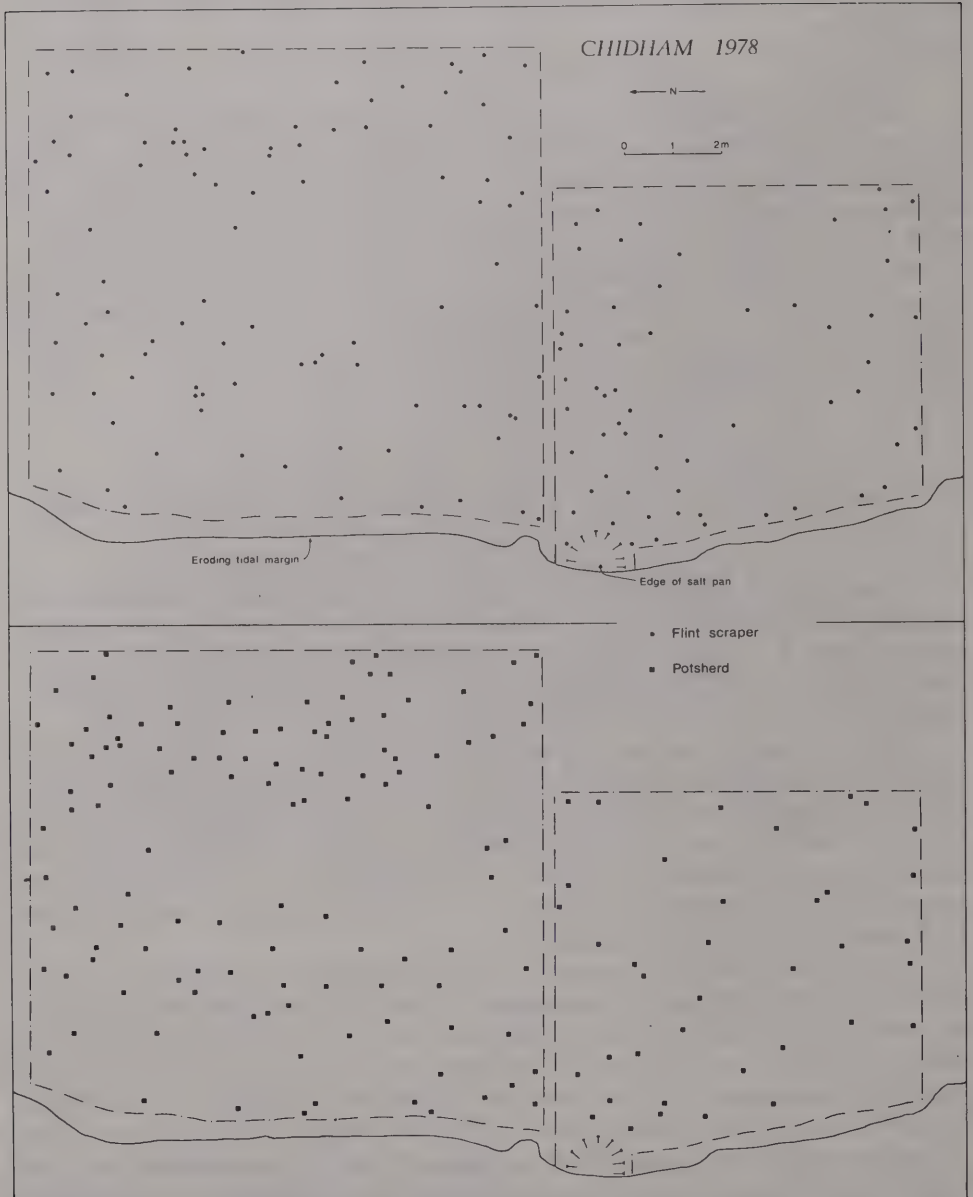


Fig. 15 Chidham 1978. Distribution of flint scrapers (above) and pot-sherds (below).

Of some interest was the finding of a considerable number of flint scrapers, many of which were inelegantly made (Fig. 15). A Neolithic date for these is probable.

## BULLOCK DOWN MULTIPERIOD SETTLEMENT PROJECT

### VIII. The Romano-British site on Frost Hill, Beachy Head, East Sussex

by D. R. RUDLING

During 1978 further field work was carried out on this site (Fig. 16, No. 1) in order to follow up the results of previous fieldwalking and preliminary excavations (Rudling, 1978a). Figure 17 is a summary plan of the grid squares that have now been walked on the site between 1976 and 1978, and the squares have been shaded to indicate the quantities of Roman pottery found in them. By comparing Fig. 17 with the Trench plan (Rudling, 1978a), one can see that there is a marked drop in the densities of sherds found in the squares to the south of the double lynchet trackway and to the east of the first field, which lies to the north-east of the gap in the trackway. It would thus seem reasonable to assume that the trackway and the field represent two of the boundaries of the site. The picture to the west is less certain and its interpretation will necessitate further fieldwalking, while to the north the steepness of the slope will have imposed a further boundary to settlement.

With regard to the pottery, it is worth noting that fieldwalking has yielded all the main fabrics and forms discovered during excavation, but that this material was naturally more abraded than that recovered from sealed archaeological contexts. Iron Age calcined flint-tempered wares usually accounted for between 1 and 5% of the total number of sherds picked up in any one square. The other main finds were

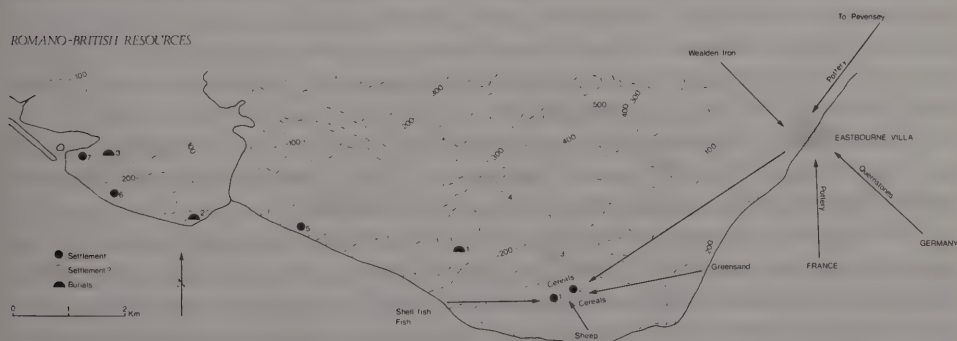


Fig. 16 Bullock Down 1978. Location of Romano-British site on Frost Hill (No. 1) in relation to contemporary sites and resources.

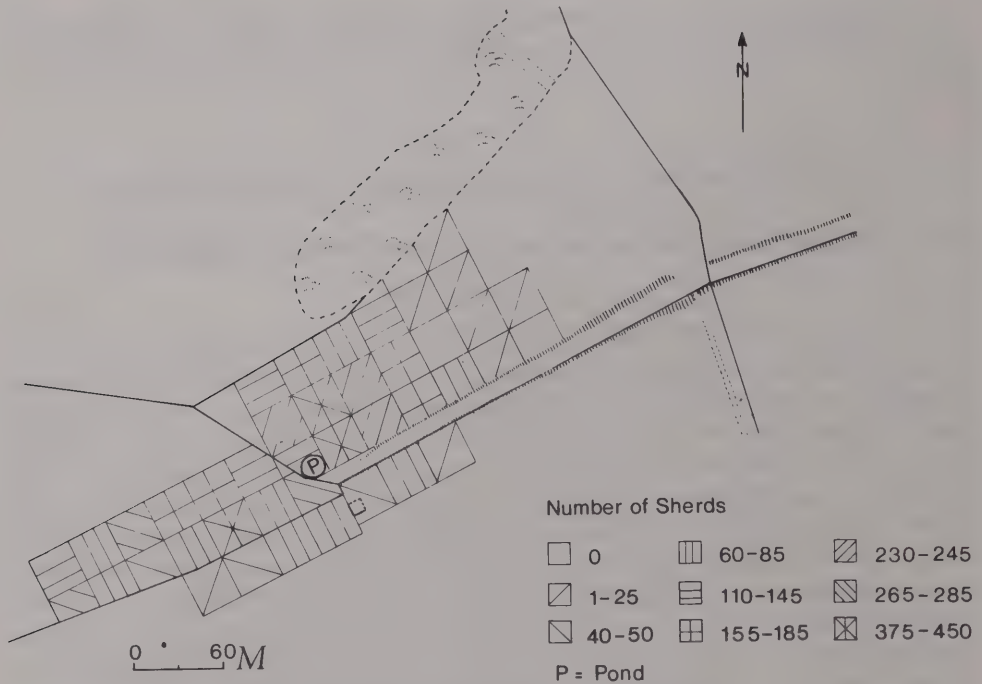


Fig. 17 Bullock Down 1978. Distribution of Romano-British pottery based on fieldwalking over Frost Hill.

building materials, especially flat Roman tiles; stones foreign to the site, and marine molluscs. Metal objects were fairly scarce, iron nails being the chief representative of this group. A coin and a bronze finger-ring were also found, together with a few bones. It is hoped that the above information on the results of fieldwalking this site will be of use when evaluating fieldwalking as a means of fieldwork for obtaining data from Romano-British sites on the Downs.

In 1978 two of the trenches begun in 1977 (Trenches A and C) were extended and a new trench (Trench D) was dug to section the double lynchet trackway at a point to the east of the Romano-British settlement.

The south-west corner of Trench A was extended in the hope that it would be possible to obtain a more complete plan of Structure One found in 1977. The extension revealed the south-west corner of the building, and also a possibly related post hole to the west of the northern end of the eastern side of the structure. Figure 18 shows a plan of this rectangular timber building, which appears to have been constructed on the basis of timber verticals with horizontal sill beams between to take

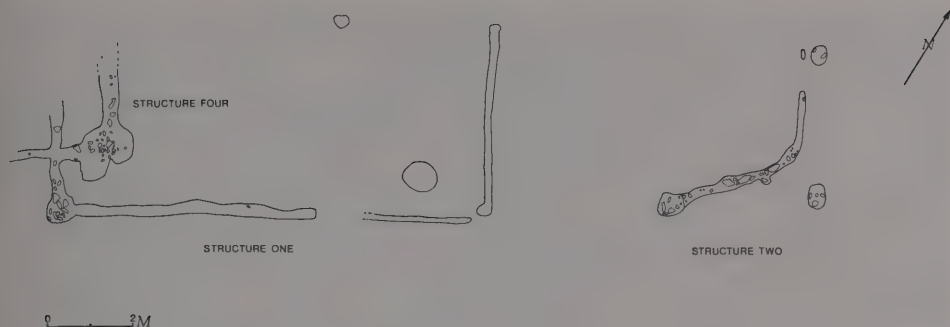


Fig. 18 Bullock Down 1978. Frost Hill. Plan of timber structures 1, 2 and 4.

the wattle infilling. For comparison Fig. 18 also shows the plan of Structure Two, excavated in 1977. This building differs from Structure One in that it combines two techniques of construction, that of timber verticals, and the other of the sill beam technique described above for Structure One.

The extension of Trench A also revealed the south-east corner of a fourth structure, with its southern side cutting into, or being cut by, the western wall of Structure One (we were unfortunately unable to prove which of the two structures had cut through the other). As in the case of Structure One, the construction technique was that based upon horizontal sill beams and timber verticals. The south-east corner showed signs of several replacements of the timber vertical, and from the latest post pit came a fairly large quantity of sherds (65 in all). The majority of these derived from parts of two jars of East Sussex Ware.

The small test trench C excavated in 1977 (Rudling, 1978a), was extended in 1978. The principal finds in this trench were two corn drying ovens, a possible threshing floor, and a marking outline for a field boundary. The only other features were a number of small, undated post holes, the majority of these belonging to a possible fence line in the south-western corner of the trench.

Feature 6 was a keyhole-shaped corn drying oven (Fig. 19 and Plate IV). This well-preserved feature was cut into the chalk to a maximum depth of 1.10 m at the base of the oven. Two burnt sandstone blocks were discovered *in situ* on either side of the entrance to the oven from the stokehole, and in between these was an area of very intense burning. At the base of the main and secondary flues was a layer of fine black ashy fill with much charred seed. A sample of these seeds (1,150 seeds), together with the rest of the seeds obtained from the site, have been examined by Mr. J. Arthur, F.L.S., who reports that the sample from Feature 6 was composed of 40% *Triticum spelta* L. (wheat) and 60% *Hordeum vulgare*. When the oven went out of use, the flues became filled with collapsed blocks of sandstone and grey-buff chalky



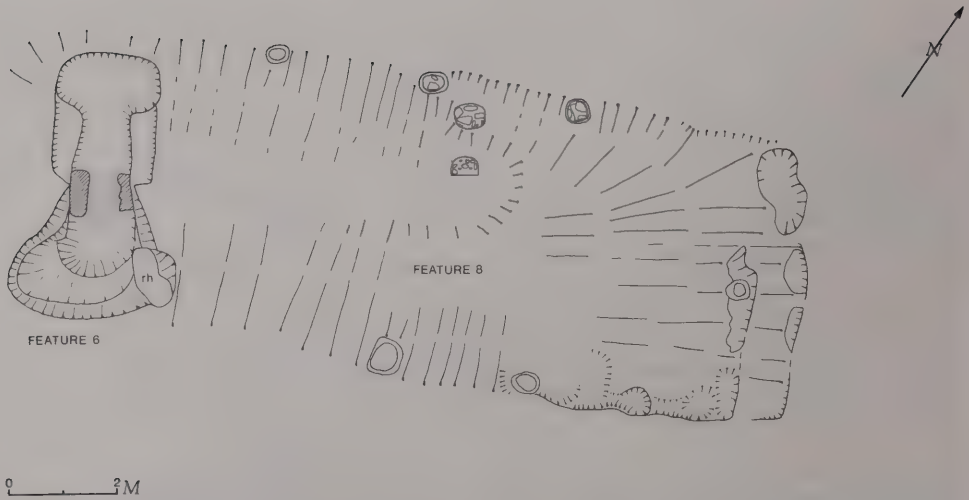


Fig. 19 Bullock Down 1978. Frost Hill. Plan of corn drying oven and threshing(?) floor.

fill, which yielded very few finds. In contrast, the stokehole was comparatively rich in domestic debris, particularly pottery and animal bones, and the distribution of these finds, especially sherds from a Thundersbarrow Ware storage jar, suggest that the stokehole was filled in deliberately over a short period. The pottery associated with this feature indicates that it went out of use in the late fourth or early fifth century.

Feature 11 was a T-shaped corn drying oven. (Plate V). This badly preserved feature survived to a maximum depth of 18 cm. It is, of course, possible that what has been discovered may just be the base of an above-ground oven. The sides of the main flue appear to have been lined with flints, while the eastern sides of the secondary flues were lined with clay. The centre of the oven was filled by a mass of flints and some sandstone blocks, three of the latter being fragments of quernstones. Unfortunately, only two small sherds were found associated with this feature and neither is useful for dating purposes. The flotation of soil samples from this feature yielded only nine carbonised seeds, all of which have been identified as six-row barley.

Feature 8 occupies the depression that was trial-trenched in 1977 (Rudling, 1978a). Along its edges are a number of post holes, and the south-eastern corner, which appears to have been constructed twice, is cut into the natural chalk. It is suggested that this structure may be a building or enclosure for the threshing of corn. The reasons for this include its proximity to the corn drying ovens, the possibility of the depression having been created by the continual pounding and sweeping of the chalk surface, and the recovery from the post holes and the soil rich in carbonised

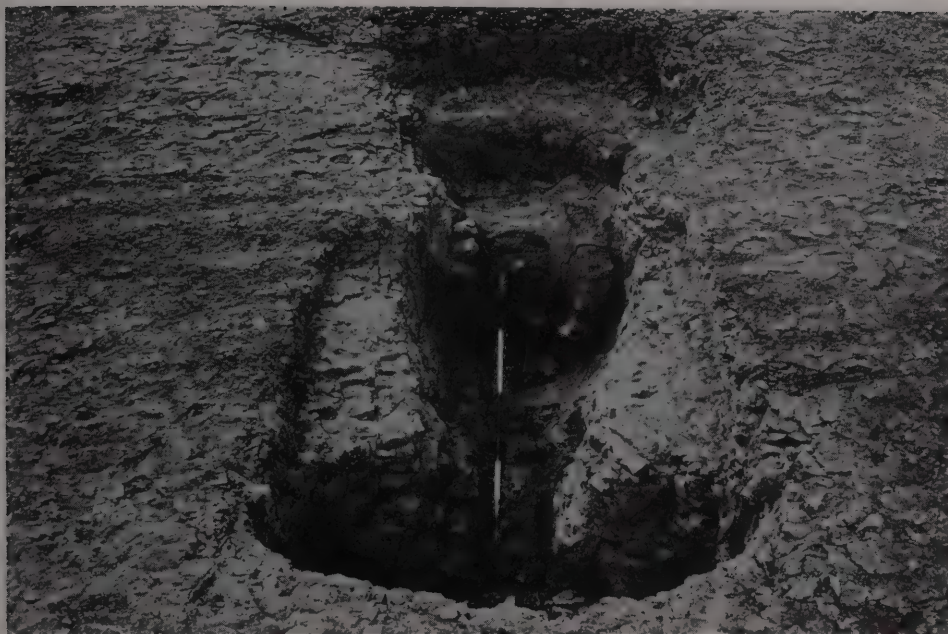


Plate IV Bullock Down 1978. Frost Hill. Keyhole shaped corn drying oven. Scale 2 m. (Photo D. R. Rudling)

matter in its south-eastern corner, of large quantities of carbonised seeds. The pottery from this area is representative of the entire Roman period, but there is a very marked predominance of late Roman wares, the quantities of Oxfordshire and Pevensey colour-coated wares being particularly striking. In addition, four late fourth century coins (three of Valens and a falling horseman type of Constantius II) were also discovered. Thus it would seem reasonable to assume that this feature also went out of use in, or after, the late fourth century.

Feature 26 was a long, narrow feature, which rarely survives to a depth of more than a few centimetres. It may be interpreted as a marking-out line for a field boundary. It lay beneath the lynchet which existed to the east of the original Trench C (see trench plan of 1977, Rudling, 1978a). Unfortunately, too few packing stones remained in this shallow feature to give a good impression of how the line was intended to function – probably a fairly modest fence – but at the northern end of the trench a single post hole was discovered adjoining the marking-out line. No dating evidence was obtained from either the marking-out line or the associated post hole.

The aim of Trench D was to begin dating the field system surrounding the settlement site. Thus a section 12.4 m long was machine cut across the upper lynchet



Plate V Bullock Down 1978. Frost Hill. T-shaped corn drying oven. Scale 40 cm. (Photo D. R. Rudling)

of the double lynchet trackway and on into the field to the north. The western face of the trench was then cleaned up and straightened before being trowelled back another 50 cms. Two dimensional recording of the artifacts was undertaken and the plotted distributions of the finds can be seen in Fig. 20. From the finds data presented in Fig. 20, it can be seen that this particular lynchet developed in the pre-Roman Iron Age and the Romano-British periods.

While excavation and fieldwalking have yielded a small number of flint flakes of indeterminate antiquity, the earliest identifiable find from the site is the tip of a Bronze Age rapier, this possibly representing a disturbed hoard since there is no complementary diagnostic Bronze Age pottery. The double lynchet trackway has been shown to have developed in the pre-Roman Iron Age, and pottery sherds dating to this period have also been found in the plough soil over most of the site, and as residual matter in a number of Roman features. The Roman pottery sequence shows that the site was occupied throughout the Roman period, but at present the state of our knowledge about late Roman wares in East Sussex is insufficient for one to speculate as to whether or not the site continued into the fifth century. There seems, then, to be a gap in the archaeological record until the early Medieval period (11th/12th centuries), which is represented by a few sherds of pottery.



## RESCUE ARCHAEOLOGY IN SUSSEX, 1978

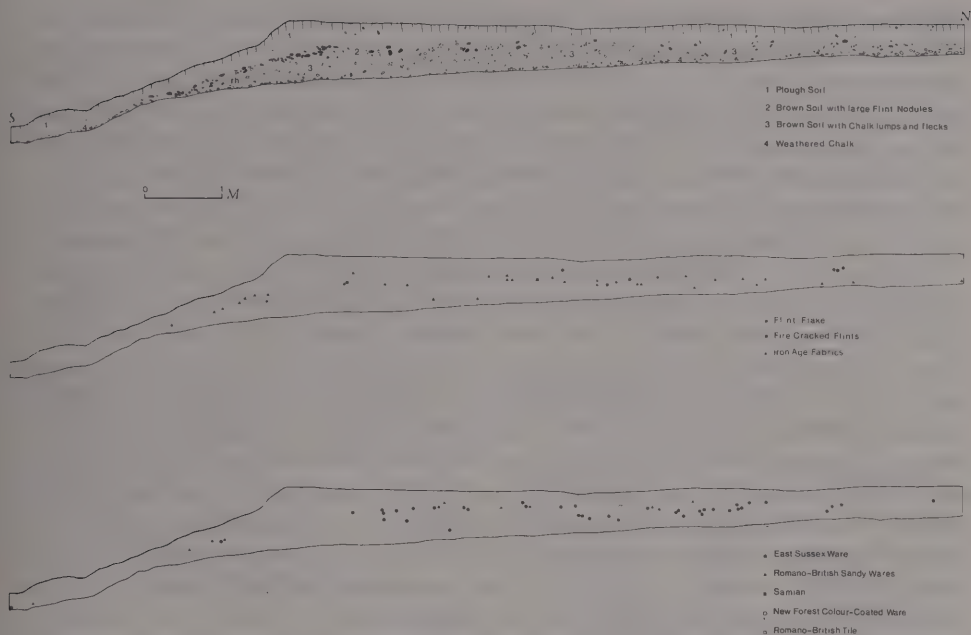


Fig. 20 Bullock Down 1978. Frost Hill. Section of upper lynchet of double lynchet trackway adjacent to Romano-British settlement.

In 1979 it is planned to complete the current programme of fieldwork on Frost Hill by carrying out excavations to the west, on land belonging to Cornish Farm. For a discussion of the interim results of the Roman part of the "Bullock Down Multiperiod Settlement Project" seen in their wide local context, see Rudling (1978b).

## THE ORIGINS OF SUSSEX TOWNS PROJECT

### IX. Excavations in Market Street, Brighton, East Sussex

by D. FREKE

Brighton was laid out anew in the 13th century, so it is possible that the earlier medieval settlement had succumbed to the sea by that date. Between 1260 and 1340, the town lost 40 acres to the sea (Aldsworth and Freke, 1976). The medieval town seems to have always comprised upper and lower sections, with the church built safely 1 km inland. The present church is 14th century, but it replaces a Domesday

structure. The priory was founded in the mid 12th century (Wallis, 1926) and it can be assumed that it was on the northern fringes of the upper town. Brighton did not have all the attributes of a town in the medieval period and it seems to have been quite poor, claiming exemption from taxation in 1340 on the grounds that, 'here there are no merchants, but tenants of land, who live by their own land and their own great labours only' (Wallis, 1926). However, there was a fair and a market (Sawyer, 1888) granted in 1312, a constable appointed from 1285, a wall built at the end of the 15th century, and the fourth largest urban population in Sussex by the 16th century.

The layout of post-medieval Brighton is graphically displayed on a map of 1545 which illustrates the burning of the town by the French in 1513 (Laughton, 1916). It shows four streets: West Street, Middle Street, East Street, and North Street, with a muddle of buildings on the beach. In the 16th century the market was in the lower town, but it was later moved to South Street, protected by the wall. Here also was built the 'Town House' and a blockhouse built in 1558. In 1665 113 shops, cottages, capstone places and stake places under the cliff were swept away, and the lower town was totally destroyed in 1705. In the 18th century the blockhouse and the market were also lost to the sea. The construction of the new market in c. 1773 on the site now occupied by the Town Hall (Fig. 21, b and c) disturbed the cemetery of the priory. Dunvan, writing in 1795, says, 'The waste land of Bartholomews being a central situation, and the common property of the town . . . was . . . the site of the new *market place*. The workmen who were employed in digging for the foundation of this building, happened to cut through a little cemetery which seems to have belonged to the above mentioned chantry there . . .' (my italics). Sir William Burrell, writing in 1778, says, 'The chapel of ye Priory stood where the present *Market House* stands, and on the building of which abt. 1773 an old wall was pulled down and several human bones were dug up.' (my italics). Wallis (1926) has pointed out that the *market house* and *market place* are two different sites, with the chapel of St. Bartholomew on the former (Fig. 21c). Bones were also found in the building of the workhouse at the south end of Market Street, and under Market Street itself to the west of the present town hall. Figure 21d is based on Wallis' documentary work.

Brighton District Council propose to redevelop the land between Black Lion Street and Market Street, and south of the Town Hall. Pilot excavations were carried out by the author over two weeks in September 1978 to check the existence of archaeological evidence prior to this redevelopment. Two trenches were excavated (Fig. 21d), Trench A 6 m × 3 m, and Trench B 7 m × 4 m. 'A' was sited to check the predicted line of the north wall of the chapel and 'B' to establish the existence of the cemetery.

Both trenches revealed traces of the market of c. 1830, but very little which could be considered to be earlier. In 'A' was the corner of a cellar, partially constructed of brick, cut by the underground inverted strainer arches of the 1830 market. In 'B' the lowest foundation course of a flint wall running north-south survived. It is possible that both these structures are remains of the town hall, which

# BRIGHTON 1978

## Location

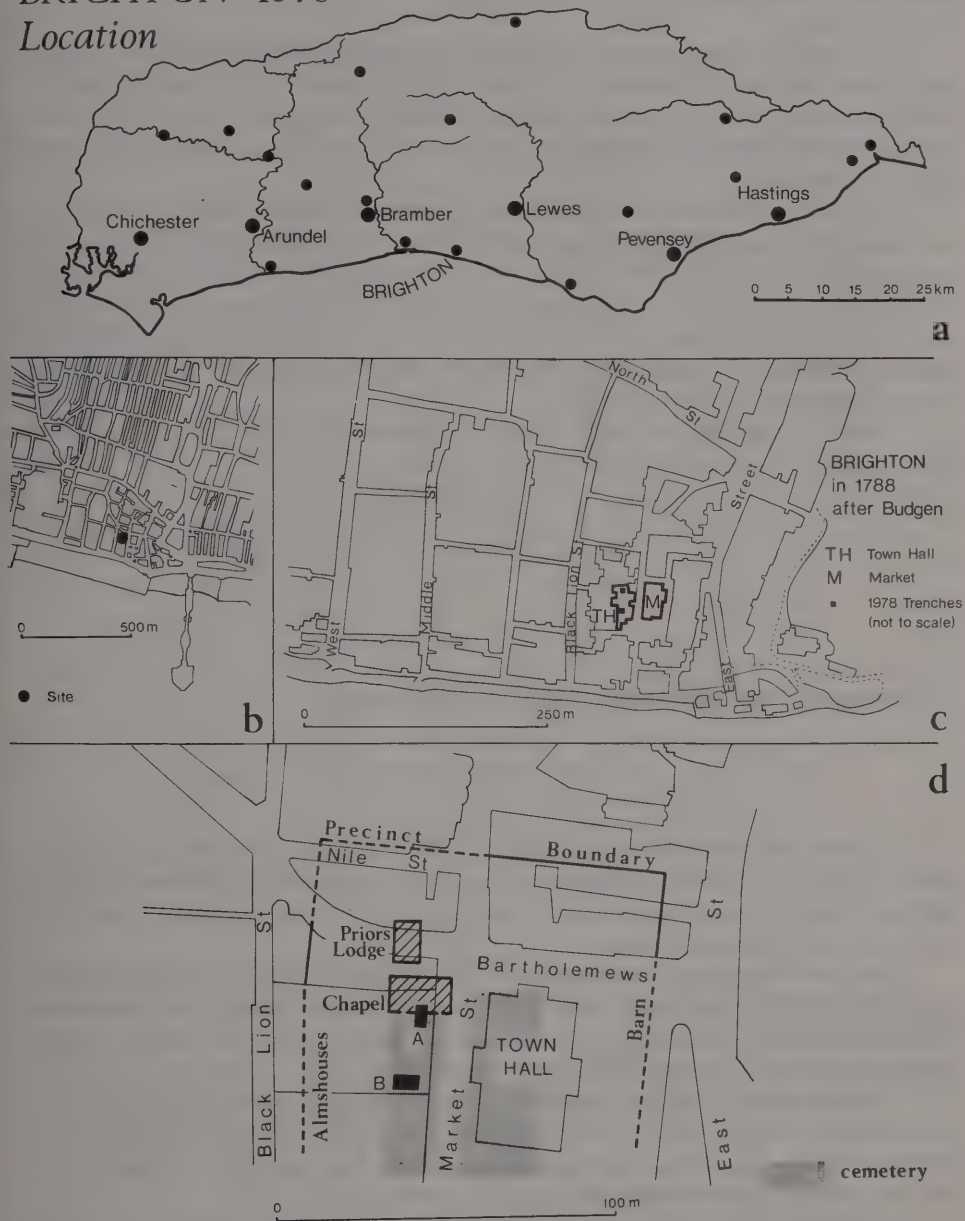


Fig. 21 Brighton 1978. Location of preliminary excavations within St Bartholomew's Priory.



stood on the west side of Market Street up to the building of the first market on the site (Fig. 21c).

No medieval structures, and perhaps more crucially, only three medieval sherds, were recovered from both trenches. Equally absent were sherds diagnostic of the 18th century, except for a few fragments of white salt-glazed stoneware. Generally the pottery could be considered to be typical of the very late 18th century and the early 19th century.

The two explanations for this are that the area has been levelled up, or that the area has been terraced. The two fragments of pre-market walls seem to indicate that terracing has taken place, but to check that this was indeed the case, a slot 3 m deep was excavated by machine across Trench B. No evidence of dumping or backfilling was visible. Despite a search of early 19th century newspapers there is no reference to what must have been the disruptive cost of removing probably a metre or more topsoil and shingle from the site.

Two more exploratory excavations are planned for 1979, on the east side of the site, to check the location of the almshouses.

## **X. Excavations at South Street, Tarring, West Sussex**

by O. R. BEDWIN

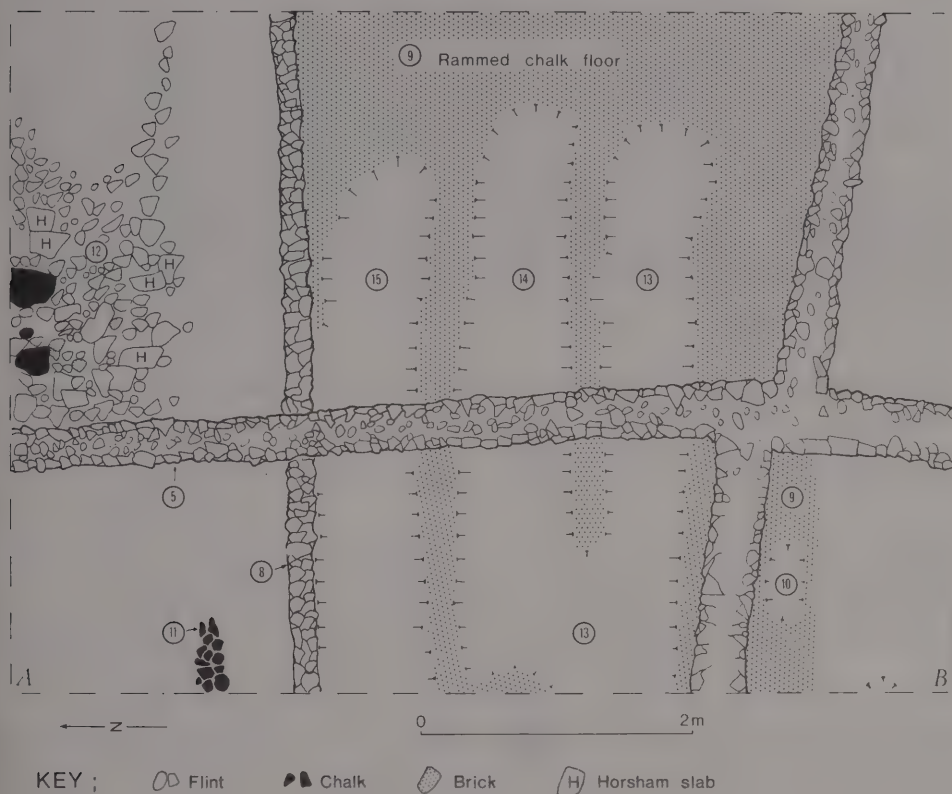
A small excavation was carried out on a site due to be redeveloped near the centre of Tarring. The site lay between the village church and the Bishop's Palace, and was close to the known site of a medieval house (Barton, 1964) and a late medieval well (Barton, 1963).

Two building phases were identified (Fig. 22); the earlier, of 17th century date, consisted of narrow, mortared flint footings and a rammed chalk floor. Above these footings and floor were the flint foundations of an 18th century cottage, which is known to have been demolished about ten years ago.

No structures or features earlier than the 17th century were found, though the earliest pottery from the site may go back to the 16th century. The absence of medieval finds suggests that the excavated area lay just outside the village, until it was built on in the 17th century.

In addition to the pottery, a late 16th century Nuremburg token and a silver farthing of Edward I were found; the latter was minted in Bristol in 1280 or 1281 (D. R. Rudling, pers. comm.).

*SOUTH STREET, WEST TARRING 1978; PLAN*



*WEST SECTION*

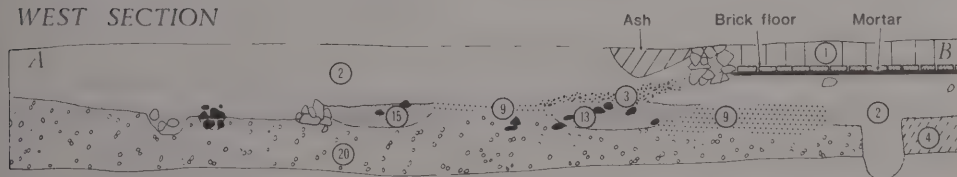


Fig. 22 Tarring 1978. Plan of post-Medieval structure.

OTHER RESCUE EXCAVATIONS

**XI. Excavation of an Early Mesolithic Site at Rackham, West Sussex**

by D. GARTON

The site is at Sparrite Farm, Rackham (TQ 048 147) on the Sandgate Beds of the Lower Greensand series. It was discovered after clearance of the secondary woodland when flakes, blades, an obliquely blunted point and a scraper were recovered. The tools and character of the debitage suggested an early Mesolithic date for the assemblage. It was decided to excavate the site, as this area has not been ploughed in the recent period. It was hoped that pollen analysis would produce some environmental evidence of the Mesolithic horizon. Pollen analysis from the nearby Neolithic site (Holden and Bradley, 1975), gave evidence of Neolithic clearance,

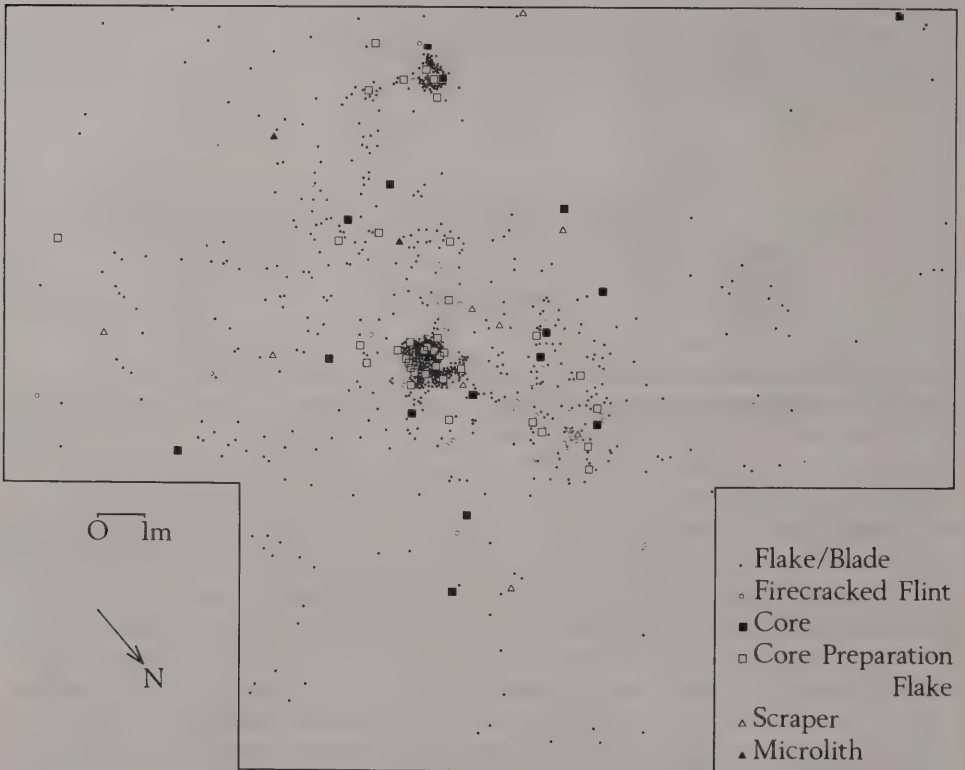


Fig. 23 Rackham 1978. Distribution of Mesolithic worked flint.

forest regeneration followed by permanent clearance which resulted in the acidification and podzolisation of the soil (Dimbleby and Bradley, 1975). No samples for pollen analysis from the Mesolithic site were taken, as the soil profile had been severely eroded and truncated since the clearance of the secondary woodland, so any pollen obtained could have not been related to the artifact levels.

The 260 sq m area excavated was trowelled down in 2.5 cm levels, all the spoil being dry sieved. The site was excavated to at least a depth of 20 cm, and in some areas to 40 cm, excavation ceasing only when no flintwork was recovered in the last 5 cm. This variability of artifact depth is partly related to the areas of concentration, but also to the variability in depth of the recent erosion of the deposits.

The flintwork recovered was plotted *in situ* (Fig. 23). No bones survived the acid conditions of the site. All the debitage was in a very fresh state, the edges had not been rolled and were sharp. An elongated trapeze and an obliquely blunted point were recovered. A retouched broken tool found may also have been an obliquely blunted point. Nine scrapers, retouched flakes and blades and waste products were also recovered. The blades comprised 50.9% of the total assemblage. The number of cores (16), and core preparation flakes (38) strongly suggest that this was a flintworking area, but the size of the area would suggest use on a limited number of occasions only. The excavated area could not be extended to the south-west to investigate any further possible flintwork concentrations in this direction, as this side was bounded by a bank for the road.

There were no structural features which could be associated with the Mesolithic assemblage. Part of the site had been disturbed by 'U' shaped gullies cut into the sand of the Mesolithic levels, and filled with humic earth. A section of one of the gullies contained part of a stem of a clay pipe; no flintwork was recovered in any of those sections excavated. The purpose of these gullies is uncertain.

Fieldwalking in an adjacent ploughed field (TQ 052 147) produced a symmetrical hollow based point, an end scraper on a blade, and a tranchet axe sharpening flake. A 10 m × 3 m trench produced a heavy concentration of debitage. At least one tranchet axe sharpening flake, and a narrow blade microlith were recovered. It is considered that this assemblage may be late Mesolithic. A barb and tanged late Neolithic arrowhead was also found.

## **XII. The Excavation of Batsford Mill and Furnace, Herstmonceux/Warbleton, East Sussex**

by O. R. BEDWIN

Plans to build a fish farm in a valley containing the known site of a late 16th century blast furnace, Batsford Furnace, were brought to the attention of S.A.F.U. by Mr C. F. Tebbutt.





Fig. 24 Batsford Mill and Furnace 1978. General site plan (from survey by John Bell and members of H.A.A.R.G.)

However, during preliminary drainage of a marshy patch of ground, substantial timbers were found, associated with 14th century pottery. An area around this initial discovery was cleared by machine, revealing the well-preserved timber framework of a medieval water mill (Figs. 24 and 25). The timbers had survived due to waterlogged surroundings and excavation revealed a finely-built structure consist-



Plate VI Batsford Mill 1978. Water wheel *in situ*. Scale in cm. (Photo O. R. Bedwin)

BATSFORD MILL 1978

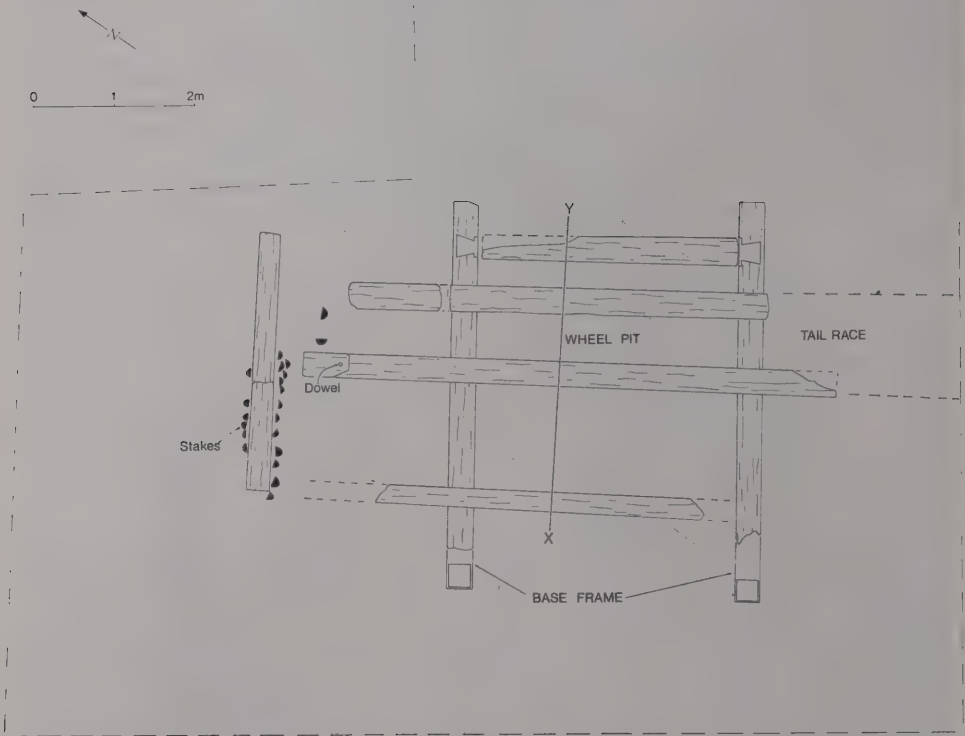


Fig. 25 Batsford Mill 1978. Plan of mill timbers.

ing of the wheel-pit and associated elements. The constructional details are similar to the 13th/14th century structure excavated at Chingley (Crossley, 1975).

Almost half of the water wheel survived *in situ* (Plate VI), and was removed for conservation. It was an overshot wheel, 30 cm (1ft) wide and 2.60 m (8ft) external diameter. Pottery from the fill of the wheel pit suggested that the mill was operating in the 13th/14th century. No trace of mill building was found, nor any finds to indicate the purpose of the mill. The three possibilities for a mill of this date are a corn mill, a fulling mill, or a forge. The last may be ruled out by the complete absence of slag. It is unlikely to have been a fulling mill because of the lack of artifacts such as pins and scissors, associated with the handling of cloth (cf. Ardingly; Bedwin, 1976). It therefore seems likely that this was a corn mill, though final proof is lacking.

After excavation of this hitherto unknown mill, a trial trench was cut across the valley (Fig. 24), immediately behind the bay, in order to locate the furnace. No signs

# RESCUE ARCHAEOLOGY IN SUSSEX, 1978

## BATSFORD FURNACE 1978

### PHASE 2 FURNACE

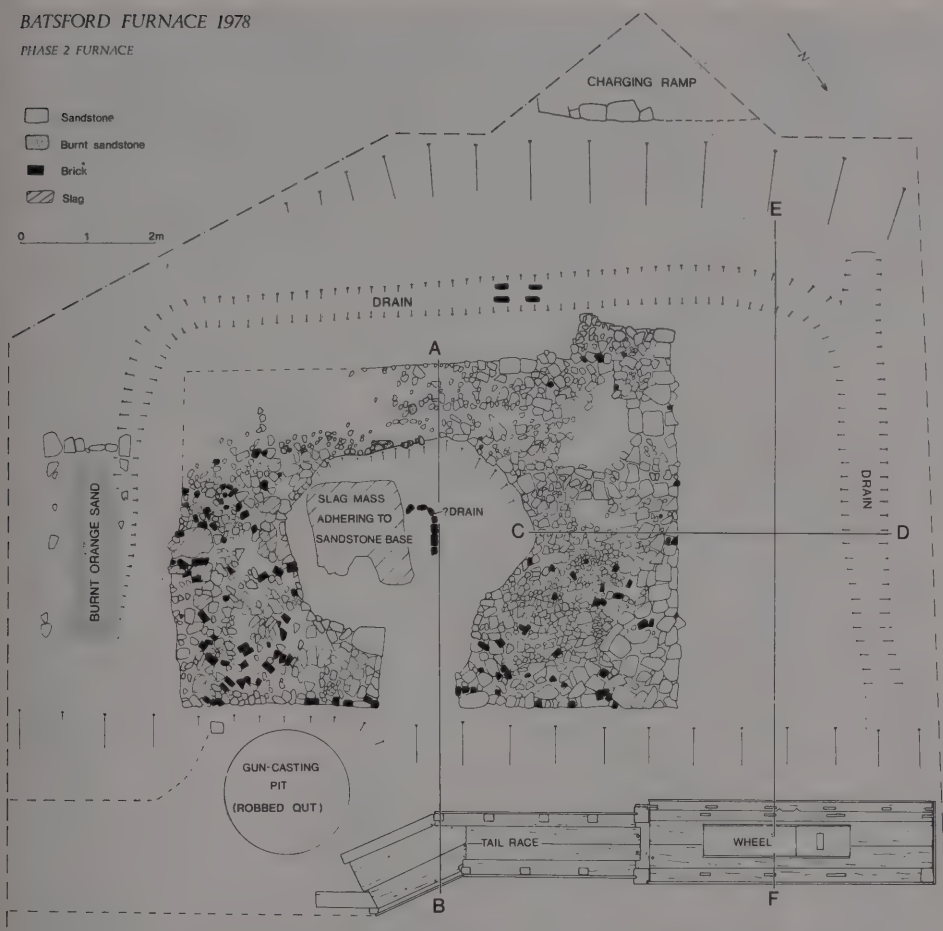


Fig. 26 Batsford Furnace 1978. Plan of phase 2 furnace and associated features.

of a structure were found, and eventually it was decided to test a rather unpromising area on the south side of the stream. It rapidly became clear that the site of the furnace was here, built on a terrace cut into the side of the valley. The terrace had become covered with rubble and hillwash, hence its unpromising appearance.

Removal of up to 3 m of overburden revealed a substantial, though crudely built, furnace (Fig. 26), in which the masonry was little better than hard-packed rubble. Other features included a shallow drainage gully running round three sides of the furnace, and also part of the charging ramp. It became evident that the wheel-pit and tail-race had lain where the modern stream ran. The stream was





Plate VII Batsford Furnace 1978. Tail-race (foreground), wheel-pit and wheel (background). Scale in cm. (Photo O. R. Bedwin)

consequently diverted to see if any traces of the wheel-pit had survived. Unexpectedly, below the stream bed, there remained much of the wooden sides and floor of the wheel-pit and tail-race (Plate VII), with part of the water wheel *in situ*. This wheel, also overshot, measured 45 cm (18in) across and 3.90 m (12ft 6in) in diameter, i.e. much larger than the wheel from the mill. Finds from the fill of the furnace wheel-pit included a few fragments of 16th century pottery and some waterlogged leather footwear.

There was a bend in the tail-race, moving its position about 1 m further from the furnace for no apparent reason. In addition a hearth, defined by an area of heavily burnt sand, about 2.50 m by 0.8 m, partly enclosed by sandstone, was found immediately adjacent to the furnace (Fig. 26). An obvious function of a hearth of this size and shape might be the baking of cannon-moulds, although there is no documentary record of this furnace casting guns. With this idea in mind, the area between the mouth of the furnace and the bend in the tail-race was examined, and the top of a circular gun-casting pit, 2 m in diameter was found. Unfortunately, it had been thoroughly robbed out, and none of the wooden lining remained. One of the wooden hoops from the lining (cf. Maynard's Gate; Bedwin, 1977) was found in the fill of the pit.

Finally, the masonry of the furnace shown in Fig. 26 was lifted, revealing a smaller, better constructed furnace on approximately the same alignment.

## Acknowledgements

The Sussex Archaeological Field Unit would like to thank the numerous people who made this year's projects possible, particularly the owners and tenants of the sites for allowing us to work on their land, and all those who helped in any way. The names of the following must be mentioned at this stage, although detailed acknowledgement will be made in the final reports: Mr E. D. Williams, Mr F. Aldsworth, Mr J. Bell and H.A.A.R.G., Mr A. Sayers, Mr E. Holden, the Department of the Environment and particularly Dr C Young, Brighton District Council, Mr P. H. Green, Mrs J. Craddock, Miss A. Macaulay, The Firle Estate, Mr P. Smith The National Trust, Mr J. Coleman, Seeboard, Mr T. P. O'Connor, Mr T. Malim, Mr R. Holgate, Dr A. Ellison and Mr C. F. Tebbutt.

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# The rescue of the ancestors in Papua New Guinea

by MARY-JANE MOUNTAIN

The aim of this article is not to present a complete and thorough up-to-date survey of the results of archaeological work in Papua New Guinea. It was prompted by many of the attitudes encountered in Britain when I was back there on a short period of study leave from the University of Papua New Guinea in 1976. These attitudes left no doubt as to the growing interest in the prehistory of the Melanesian and whole Oceanian and Australasian region but displayed considerable ignorance as to what is actually happening in the prehistoric research of the area, the aims of those working there, the attitudes of local populations and governments, some of the more common difficulties encountered and some of the considerable achievements attained so far. This is a brief and rather superficial attempt, following several public lectures given in the UK, to fill a few of those gaps as far as Papua New Guinea Prehistory is concerned and to provide some indications of where to look for further information.

First it is necessary to emphasise that we are discussing 'Prehistory' and not pure 'Archaeology'. In parts of the world where the period of prehistory is still vitally close to the present day memory and lifestyle, especially outside urban centres, there is an immense amount of information that can be utilised by the excavator in the process of interpreting archaeological material. It is not impossible for an archaeologist to find a site, excavate and analyse the finds and write up a report, but they would be overlooking much of possibly relevant ethnographic information (especially in the use of natural resources and technology), oral traditions, linguistic evidence and possible historical information. However, as Peter Bellwood points out although

'linguists, geneticists and social anthropologists working in the Pacific can often make very useful inferences about the past, they must, in the absence of written records, make these inferences from the pattern of present phenomena'.

(Bellwood, 1978: 21)

Obviously the farther back in time one goes, the less use can be made of such approaches, but in a country where past and present are so inextricably intertwined



an interdisciplinary approach is vital to the fullest and most meaningful interpretation of the past.

The battle for the recognition of the value of Prehistory amongst the demands of 20th century 'progress' is still being fought even in many so-called developed countries. However in most European culture-based countries there are at least some trained museum staff engaged in archaeological work, active departments of Prehistory or Archaeology in the Universities and often Government departments concerned with the protection and legislation of archaeological sites and objects, often assisted by enthusiastic local societies fostering research and excavation of individual sites. There may still be a good deal of controversy over the amount of finance to be set aside for this type of work or when sites are to be preserved or at least thoroughly excavated and which personnel are to deal with various aspects of administration and research. However, basically many people have accepted that the study of the past by archaeological means is of value to the modern state and that it should be allowed to take its part in the wrangle for government finance and assistance.

This is certainly not true in many of the Third World countries, where many governments have still to be persuaded that Prehistory has a value for their national future. There are battles to establish or continue the teaching of Prehistory in Tertiary and Secondary educational establishments, to train nationals in relevant subjects or to provide paid positions within government institutions. The state of prehistoric research in Papua New Guinea is encouraging but there is still a long way to go in persuading those in authority of the value of such work and the necessity of spending at least a little of the national income on providing government services in these fields. But there are good signs to encourage the fighters, both national and expatriate. In Papua New Guinea there is much discussion of the necessity for 'The Melanesian Way' and for the need of a feeling of continuity with the past to be expressed in a 'Cultural Identity'. The National Cultural Council was created in 1975 and in 1978 the President of that institution wrote that

'an important major objective of the Council was to help the emergence of a Papua New Guinea identity'.

As well, the Constitution of the Independent State of Papua New Guinea states in its preamble that

'We, the people of Papua New Guinea, united in one nation, pay homage to the memory of our ancestors, the source of our strength and the origin of our common heritage, acknowledge the worthy customs and traditional wisdoms of our people, which have come down to us from generation to generation, pledge ourselves to guard and pass on to those who come after us, our noble traditions'.

The value of the past is beginning to be recognised again and some pre-European traditions are being upgraded from the 'Best-Forgotten' disposal bin

where they were thrown as an after-effect of the first missions and administration. Prehistory is regaining its reputation and must continue to prove its worth.

What has so far been achieved within the field of Prehistory in Papua New Guinea that can show the value of this research to the present and for the future? In 1972 Jim Allen gave an account of the state of archaeological research in the country (Allen, 1972a). What he described was the beginning of the framework of knowledge of the prehistory and archaeology of the diverse environments, climates and topography of those scattered islands and half that vast bird-shaped island that lies north of Australia, the west part of which now belongs to Indonesia, under the name of Irian Jaya.

### **Prehistory in the Highlands of Papua New Guinea**

Since 1972 no confirmed earlier C14 dates have been published for the earliest occupation of the country by man. Kosipe, in the mountains of the Central Province, still has the earliest documented dates associated with human material, ranging back as far as  $26,870 \pm 590$  bp (White, Crook and Buxton, 1970). C14 dates for human occupation in Australia, at that time still physically joined with Papua New Guinea into the continent that has been named Sahuland, extend back as far as 40,000 bp but speculation continues over earlier possible entry dates for hominids arriving over the Wallace Line from the enlarged land mass of Southeast Asia, or Sunderland. Dates as early as 120,000 bp have been suggested as not being beyond possibility, but this is certainly not yet backed up with substantial finds or carbon dates. (For the best general discussion so far see Kirk and Thorne, 1976.)

A great deal of recent research on the environments of those early years of human occupation has given us a clearer idea of the varieties of environment open to the new arrivals and the necessary adaptations they would have to make to survive in them. Unfamiliar suites of plants and animals would have been encountered in the coastal areas, islands and fringing reefs, in the river swamps, inland savannas and mountain rainforests of varying types, in the higher subalpine forests and alpine grasslands under the snow line. In these alpine grasslands, above the tree limit, hunters may have found rich hunting sources and a much appreciated mobility of movement (Hope and Hope, 1976). There is good evidence that a far larger area of shrub-rich grassland existed in the Highlands of Papua New Guinea during man's initial occupation of that region until the grasslands began to shrink due to climatic changes after about 10,000 bp.

In the Highland zone archaeological investigation continues in the caves and rock shelters of many limestone areas, as well as in occasionally located open sites, although these are, of course, far more difficult to find, especially beyond the period of remembered human occupation. Virginia Watson and David Cole have recently published the results of their investigations in the 1960's in the Eastern Highlands

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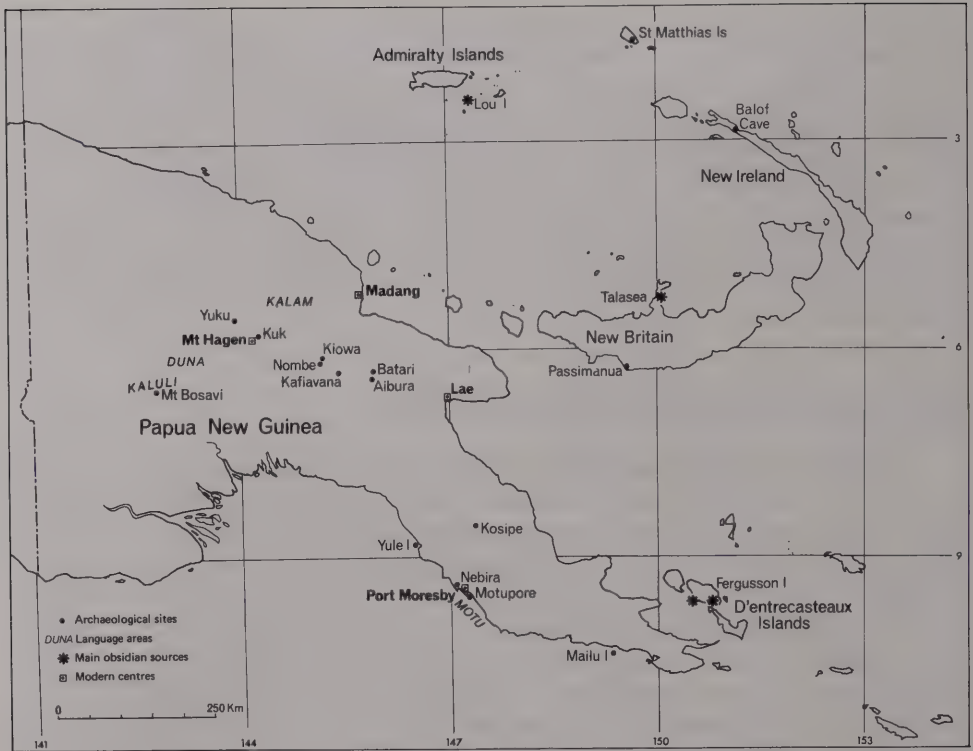


Fig. 1 Map of Papua New Guinea to show the archaeological sites mentioned in text. Drawn by Winifred Mumford, Department of Prehistory, Research School of Pacific Studies, A.N.U., Canberra.

(Watson and Cole, 1978). They have produced a series of C14 dates ranging from 18,000 bp to the near present from a number of mainly open sites. During this time several cultural changes were accomplished including the introduction of round houses, pottery, earth ovens, earthworks, monoliths and adzes into a continuing suite of chipped stone artifacts. These, like the majority of stone artifacts in Papua New Guinea, have proved extremely difficult to analyse and classify due to the lack of easily identifiable categories or shapes into which they can be placed. Most archaeologists have resorted to complex typologies based on the recognition of use-wear or chipping on individual parts of any artifact (White, 1972; Watson and Cole, 1978). Other excavations, mainly in caves and rock shelters, from sites such as Yuku, Western Highlands, Kiowa and Nombe (Niobe), Chimbu Province and Kafiavana, Batari and Aibura, Eastern Highlands Province (see Fig. 1) have established that human occupation in them goes back at least to 12,000 bp and probably a good deal earlier (Bulmer, S., 1975; White, 1972). So far, the earliest stone artifacts found on archaeological sites anywhere in Papua New Guinea are still the so-called



'waisted blades' (these can in fact vary considerably in shape from a waisted to a butted or even tanged shape and are not in any way true parallel sided blades) (Bulmer, S., 1977). These chipped stone tools have been found at Yuku, Nombe, Kiowa, Kafiavana, Batari, Kosipe and in surface collections from Passimania, southern New Britain. Although they do occur in early contexts at some sites they also continue until at least 6000 bp and Susan Bulmer finds little consistency in other aspects of these artifacts (i.e. signs of multifunctional use on different parts of the artifacts, wide variation in metrical features etc.). Presumably, as with many other stone tools found throughout the human history of the country, these artifacts were not used exclusively for one purpose but served as extremely useful, adaptable, multifunctional tools. Many stone artefacts show extensive step-flaking, often occurring on steep edges, but there is a wide variety of shapes and edge-angles and raw materials used. When Peter White and Nick Modjeska tried to test some of the attitudes and intentions in the minds of a group of stone workers they found a remarkable variety in these also – many different shaped stone flakes served the same purpose to the satisfaction of the artisan (White, Modjeska and Hipuya, 1977). This means that on any archaeological site as much, if not more, attention has to be given to the apparent debris of stone working, as to the easily recognisable tool shapes or recurrent types of artifacts that occur. Stone flakes may have been made for one purpose in the first place but could have gone through several other functions before being discarded for the archaeologist to discover much later, after natural weathering. Although dying out rapidly it is necessary to try to record the technologies that do still survive in the memories of a few people regarding the utilisation, trade and working of stone. In his extensive survey of the Highlands trading networks Ian Hughes followed the trade and exchange patterns of many products of the Highlands and how, within remembered time, these were produced and traded around and out of (or into) the Highlands area (Hughes, 1977a and 1977b). Many products were involved, such as the bird of paradise feathers, salt, stone artifacts and raw stone, mineral oils and shells. Many of the stone sources are well documented (Chappell, 1966) and there is still a great deal of knowledge amongst the older men, who either remember making and using stone tools themselves, or at least watching their fathers and uncles doing so.

One topic which has received more attention recently is the question of the presence of extinct fauna in sites known to have been used by man and the issues of contemporaneity and the hunting and killing of these animals by man (Hope, J., 1977). In two sites in Chimbu Province the extinct Tasmanian wolf (*Thylacinus cynocephalus*), a carnivorous marsupial has been found on sites that were inhabited by man. At Kiowa Susan Bulmer associates the remains to Level 9, which is dated to between  $6100 \pm 160$  bp and  $9920 \pm 200$  bp, and is a component in the earliest occupation sequence on that site (Bulmer, S. 1975: 36). The thylacine remains from Nombe (Niobe) excavated by the author have, as yet, not been dated. Here also have been identified remains of an extinct kangaroo of the *Protemnodon* species found in



the basal layers of the sites which did contain human artifacts, including 'waisted blades' but the close association of these bones and stones has still to be thoroughly tested. This site is being worked on at present and could produce some interesting results. There are very extensive faunal remains, which might yield some indications of the changes that must have occurred during the periods when agricultural techniques and sedentary villages were first introduced. So far it has proved impossible on most sites to pinpoint the period of change from only hunting and gathering to the beginnings of gardening but this is a field in which a lot of interest is being shown (Allen, 1977a).

### **Value of Ethnographic Information to Hunting-Gathering Studies**

Ethnographic information, both from recent anthropological studies and from the letters and reports of a more historical nature written by missionaries, administrators and other outside visitors over the last 100 years, can contribute in important ways to studies of prehistoric hunting, gathering and collecting activities. Obviously technologies and environments have altered considerably over time, but such studies and descriptions can often suggest, especially to the expatriate worker unfamiliar with the culture of an area, certain possible lines of interpretation or a clue as to how a detail in the archaeological record could possibly have fitted into an existing life-style in prehistoric times. Ralph Bulmer, in particular, has been very active in documenting the existing technologies and strategies used in hunting, as well as the oral traditions connected with these activities and the classification systems used for certain types of wild life in the language area of the Kalam group, living in the Schrader Ranges, inland from Madang (Bulmer, R.N.H., 1968, 1976; Majnep and Bulmer, 1978). There have been many other anthropologists and field workers in various regions of Papua New Guinea who have documented to a greater (or lesser) depth the hunting strategies and wild life of their field area, or who have recorded diet and the intake of wild foods. The following references are a small selection that the author has found of value personally (Morren, G., 1974; Ohtsuka, R., 1977; Clarke, W. C., 1971).

In 1974 I recorded a group bat-hunting activity that took place in the Chimbu Province. It was in the same area as the prehistoric sites of Kiowa and Nombe (Niobe) not far from where Peter Dwyer had painstakingly recorded male hunting activities involving bats and other small mammals and birds that are still found in the secondary forest growth around the shifting gardens on the back of the great limestone ridge that runs from Mt Elimbari to Chuave (Dwyer, 1974). A large sink hole (diameter c. 25 m), in which colonies of flying-fox bats (*Dobsonia* spp.) usually lived was, over a period of three days and nights, entirely 'roofed' by a lid constructed of timbers, vines and vegetation. The flexible mesh of intertwined timbers was laced and tied back to existing trees, rocks or failing these natural supports, large timber

THE RESCUE OF THE ANCESTORS IN PAPUA NEW GUINEA



*Plate I* Work in progress on construction of timber 'lid' to cover a large sink-hole in the Chimbu Province of Papua New Guinea for the hunting of bats. Photographed by M-J. Mountain.

posts driven into the subsoil round the edge of the hole. Strong timbers were placed tangentially around the lip of the hole, after the initial clearance of grass and other shrublike vegetation. Gradually the area of the hole was reduced by filling in the spaces with more trunks and branches, woven together and supported by sturdy vines, acting like ropes or cables. Smaller branches were threaded through the large main supports always leaving holes that were large enough for a fully grown bat to force its way through from below (which meant that often the holes were also large enough for some of the men capering around on this perilous cover to fall through, although there never seemed to be any danger of this occurring in fact). Finally the whole structure was covered with cut leaves and grass and on the fourth moonlit night after the commencement of operations, about 20 men armed with stout sticks placed themselves at spaced intervals squatting on the lid. As the bats attempted to get out of their prison (in order to obtain the food that they had been unable to reach for several days) the nearest man grabbed the heaving grass and hit the bat on the head, throwing the recumbent body to his kinsmen and kinswomen who were sitting round the edge of the sink hole. Plate I shows the 'lid' under construction. The only artifacts necessary throughout the entire proceedings were a cutting edge capable of felling

the necessary trees and vines and a simple club in order to stun or kill the animals as they emerged. However the mental skills and traditional knowledge that were used in the overall planning, design and implementation of the community effort were considerable and showed impressive communal effect and coordinated planning. There is no proof that this method of hunting had existed for very long before the similar methods were seen by some of the first European arrivals in the Highlands (1930s), but on the other hand there are no technical reasons in fact why such methods should not have been utilised for thousands of years.

Such hunting and collecting activities nowadays supplement the products of the gardening processes that are prevalent in most areas of the country. Sometimes activities are undertaken now more for display, prestige or show but the final products are consumed rather than wasted. In many areas today the varieties of wild fauna and edible floral species that played important dietary roles in the past have been greatly diminished both by the over-hunting of an expanding population with access to firearms or other sophisticated techniques, and the huge increases in the area of garden plots that have steadily encroached on the surrounding forest environments. In many regions vast areas of manmade grasslands have overtaken what was previously forest and these grasslands are unsuited to the smaller forest dwelling arboreal species often hunted and eaten in the past such as cuscus (Phalangeridae family) or tree kangaroos (*dorcopsulus*, *dorcopsis*, *dendrolagus* or *thylogale* spp.). Bird of paradise have been pursued for their brilliant plumes, for use in ceremonial dress and the large forest-floor dwelling cassowary has declined although sometimes they are kept in captivity and bred. However the acquisition and digestion of wild foods, including small mammals (often rats), reptiles (frogs, lizards and snakes) and birds as well as natural fruits, roots and leaves does still play an important part in the protein intake for many rural villagers, even today.

### **Introduction of Gardening to the Highlands**

Until the present, and probably for a while to come, the major archaeological research projects have been carried out under the aegis of research institutions that are based and funded outside Papua New Guinea itself. The Department of Prehistory in the Research School of Pacific Studies at the Australian National University, Canberra has a well developed research interest in the prehistory of Papua New Guinea and has provided the necessary finance to support a number of research projects on a larger scale than would have been possible from within the country. Outstanding amongst these has been the project led by Professor Jack Golson centred at KUK Tea research centre, near Mount Hagen in the wide Waghi river valley of the Western Highlands Province. Here, what began as the examination of a system of immediate underground ditches, that had shown up in aerial photographs of the region, has become a vast project involving the history of agriculture of the



area back at least as far as 9000 years ago. It is possible to document in the soil record of the swamps the initial clearance of the forested slopes surrounding the valley and there is speculation on the simple technology that was involved in a complex system of water controlled agriculture probably involving the introduction of food plants (such as taro and yam) from the South-East Asian area, possibly together with use of local indigenous plants such as varieties of sugar cane, bananas or local greens (see Powell, 1976: 179; Golson, 1976, 1977a and b, 1978; Golson and Hughes, 1976). The increasing use of drainage ditches and the concomitant sophistication that must have been present in these communities with the implied knowledge of their terrain, its drainage, water control and plant manipulation is only just beginning to be realised on a world scale, whilst research continues. Obviously Papua New Guinea can provide excellent information in the search for the origins of various types of agriculture and use of both local and introduced crops. The KUK project is an excellent example of the cooperation that can be so effective between various disciplines associated with Prehistory. Archaeologists, social anthropologists, geomorphologists, geographers and oral historians have all played a part in extracting the materials for the Prehistory of the region, none could have produced the results alone – only by cooperative work with both local knowledge and expatriate skills can the best results be obtained.

### **Ethnoarchaeology**

Other combined research projects could have shown useful combinations of skills and interests in elucidating various aspects germane to prehistoric studies. Often geographers have worked on projects which involve the acquisition of information from the recent past which has opened new perspectives for the prehistorian. Ian Hughes, for example, worked on the various trade objects that passed back and forth within the Highlands immediately before and during the first years of European penetration there in the 1930s. These exchange systems have a long history within the Highland regions, and were the means of providing links with the outside world and so allowing the entry of new ideas to otherwise isolated communities existing with their own cultural traditions and often independent language (Hughes, 1977a and b). Sometimes there has been useful cooperative work between archaeologists and social anthropologists. One good example of this is the project (already mentioned) undertaken by Peter White and Nicholas Modjeska (White, Modjeska and Hipuya, 1977). They attempted to ascertain the mental images in the minds of a group of Highland men, who still had a tradition of stone tool making and using. This ethnographic experiment was used to test some widely held archaeological assumptions concerning the nature of 'Culture' and 'cultural traditions' as evidenced in archaeological remains. The authors attempted to reconstruct the mental templates inside the artisan's mind of the finished object that he was about to create. These



cognitive or 'emic' concepts, as distinguished by the artisans, could be tested by setting up experiments involving stone working and classification of the results by other men in the communities (from the Duna people of the Lake Kapiago area of the Southern Highlands Province). The stone technology of these people is very simple, and the unretouched products, called locally *aré* (which can be either flakes or remnant cores), are used immediately for a variety of functions after they have been chipped from flint or chert nodules. Difficulties over the ways in which people from varying cultures classify such objects became obvious during the experiments. The workers said, on being asked to sort the *aré* into groups, that this was not done in the past, and even words given to different types of *aré* were found to apply equally well to different classifications, e.g. one involving the sharpness of the flakes or another the quality of the stone and the extent of weathering on any piece. Obviously there were great differences in how any one worker saw the finished product that he was to make and the jobs for which it would be suitable. There were some basic agreements but no one clear mental template emerged. Perhaps, as one of the authors wrote 'the problems lie in our over-precise and over-simplified ideas about the social structures, classifications and technological procedures of non-industrial societies' (White, 385 in White, Modjeska and Hipuya, 1977).

Another experiment involving ethnography, social anthropology and archaeology was undertaken in the Mount Bosavi area of the Southern Highlands Province. Here Edward and Bambi Schieffelin and their small son had lived for a total of nearly four years observing the details of daily life of the Kaluli people of that area (Schieffelin, 1976). Edward was particularly interested at one period of his research in the construction and rituals that were connected with house-like structures known as the *Bau Aa*, which were used as ceremonial hunting lodges and retreats for the young unmarried men of the community, in the days before the Christian missionaries brought changes to the traditional beliefs of the people. Edward invited me to excavate a particular known example of one of these structures, that had been used in their youth by several older informants still living in the local long house. The experiment provided extra factual information in the elucidation of the rituals observed and how these fitted the cosmology of the community for the anthropologist, and provided the archaeologist with the interesting situation of excavating a site for which there were still living informants, who could describe the structure as well as the way in which it was used and the methods of construction. Since the site was located in an area of thick secondary forest-growth at moderate elevation (about 1000 m a.s.l.) and in a region where the annual rainfall exceeded 4000 mm, archaeological sites would normally be very hard to find there, as forest growth would cover any traces of human occupation very rapidly. This was an opportunity to excavate a known site, in a logistically difficult area, with the assistance of informants, and to test the cooperation of an anthropologist and an archaeologist working on a fairly straightforward one period site. The results were interesting to both sides and rewarding. The site proved easy to locate and after

initial clearance (which involved the removal of several 'favourable' omens in the appearance of some very dangerous snakes), was moderately easy to excavate (although there were irritations in the form of innumerable mosquitoes and very heavy daily rain). It had only been possible to bring a minimum of equipment, since everything had to be transported by small plane to the local mission strip from Mendi, and then had to be carried by local villagers for about four hours to the village. The informants were spurred to further and deeper recollections about the site during the work and the author was given several salutary lessons in archaeological interpretation in discussions over various internal features. Plate II shows the site as finally excavated. One of the most valuable aspects was the building of a small model of the original Bau Aa structure by informants (Plate III) showing exactly how the roof timbers were placed and the rack for smoking the products of hunting which was constructed over the internal hearths. The report of this work is still being prepared by Schieffelin and Mountain. Such prehistoric work could well be carried out by students who had not had extensive field experience and could become valuable components in joint programmes with other workers in ethnography, oral tradition and local environmental studies.

### **Prehistory in Coastal and Island Papua New Guinea**

Combined research has also been used to elucidate the prehistory of the Port Moresby area and Papuan coastal regions. Many workers, both Papua New Guinean and expatriate, are contributing to the history of the Motuan people and others who lived in these regions before the arrival of the Motuans (the present day occupants around Moresby itself) or who occupied other ecological niches, such as the Koita people who lived in the immediate inland hills and savanna hunting and gardening districts, inland from the coastal Motu. Excavations at Nebira hill, Yule Island, Motupore Island, Mailu Island and surrounding areas (Fig. 1) (Bulmer, 1975; Vanderwal, 1978, Allen, 1972b, 1976, 1977b and 1977c; Irwin, 1978) confirm the presence of complex trading patterns that existed long before the impact of European trade goods or economies was felt. Through the exploitation of various local environments excess products were produced, for example the coastal and reef dwellers made shell ornaments and pottery and smoked their excess fish. These were exchanged for other essential articles or raw materials not available within their territory, such as good quality stone for axes, vegetables and meat to supplement their sea foods. In the Mailu region Geoffrey Irwin uncovered a lengthy complex of prehistoric trading patterns involving the production of local pottery, that was gradually monopolised by the Mailu Islanders themselves to their advantage. Trading of other products on the coastal and island areas has been traced back over thousands of years and has been found to cover many thousands of kilometres by sea. Obsidian sources are known to have been utilised by some of the earliest island

MARY-JANE MOUNTAIN



*Plate II* Excavation of a Bau Aa ceremonial hunting lodge in the Southern Highlands of Papua New Guinea. Photographed by M-J. Mountain.





*Plate III* Edward Schieffelin watching Selibi reconstructing a model of the Bau Aa ceremonial hunting lodge that was excavated in the Southern Highlands of Papua New Guinea. Photographed by M-J. Mountain.

communities in a widespread network involving sites on Lou Island, Admiralty Island group, Talasea in West New Britain and Fergusson Island, D'Entrecasteaux group in Milne Bay (Map 1) (Ambrose, 1976 and 1978). To quote one example, obsidian mined on Lou Island has been found in the New Hebrides, as well as in the St Matthias islands where it is associated with the ubiquitous Lapita Pottery. This attractive, well-made, sometimes red slipped pottery tempered with sand or crushed shell, is amongst the earliest pottery found so far in the country and occurs on sites from the St Matthias Islands to New Caledonia, with dates ranging from earlier than 3000 bp to about 2500 bp (Green, 1976).

In New Ireland at Balof Cave preceramic levels have been dated to c. 6500 bp with obsidian from Talasea, whereas by 3000 bp Lou Island obsidian is found with pottery levels (White, Downie and Ambrose, 1978). After the breakup of the Lapita tradition and complex, individual communities emerged in many of the Melanesian Islands and in areas of coastal occupation on the mainland of Papua New Guinea too. Some interesting prehistoric studies have been done in these regions in recent years, often involving extensive use of ethnographic information (for example Egloff, 1978; Lauer, 1976; Dutton, 1977; Specht, 1974 and Terrel *et al.*, 1970-77).



### **Value of Oral Traditions and Language Studies**

When it comes to studying those more recent periods of prehistory oral traditions and the study of languages can add a great deal more information to archaeological results. It is thought by linguists that the so-called Austronesian languages (often associated with the Lapita complex) arrived from Southeast Asia not more than 7000 years ago. The other main group of languages (called the Non-Austronesian or Papuan languages), have been developing in the main Highlands areas of Papua New Guinea and West Irian for probably at least 10,000 years, and in some places longer (Wurm, 1975; Dutton and Lynch, 1977). Robert Blust has attempted some useful speculations based on both linguistic and archaeological evidence (Blust, 1975). He proposes that the original Austronesian speakers were in possession of root and grain crops, domesticated pig, dog and chicken, were efficient navigators and sailors who normally lived in sedentary villages. The interpretations from the linguistic and archaeological evidence do not always fit very closely, as for example in the suggestion from the linguistic evidence that these people know about the use of iron, for which there is absolutely no archaeological evidence. But totally perfect fits in all interpretations of the prehistoric past would be just as surprising.

The use of oral tradition as a tool towards the reconstruction of prehistory can also be criticised but often it is invaluable. Percy Chatterton (Chatterton, 1978) points out the dangers of the failing human memory and the gradual adaptations that can occur in oral traditions to fit the community or personal needs of a particular period of time. Certainly these sources need all the cross checks possible and often a single reference cannot be accepted at face value but when used with discretion and caution oral traditions of one area can provide another insight into the prehistoric past, as for example in the Motuan area (Oram, 1977: 89) or in the Highlands (Blong, 1975).

### **The Future of Prehistory in Papua New Guinea**

Total reconstruction of the Prehistory of Papua New Guinea will, of course, never be possible. The evidence is only partial to start with and there are too many gaps left by the passage and destruction of time. Accurate and detailed histories of existing communities may be beyond the possibilities of prehistory in many cases but the value of prehistory should be seen in a broader and more general sense. Only through the approaches of the prehistorians in many fields can Papua New Guinea research its own independent and unique history, from the first human settlements to the early impacts by Europeans (Golson, J., 1970). There are many different types of Prehistory that can be pursued by Papua New Guineans, especially through the

medium of their local languages, in recording oral traditions, ethnographic details and traditional technologies before these disappear. An effort should be made to ensure that all development schemes are provided with the necessary finance for field surveys to be done well in advance of any changes to check prehistoric sites or other information that might otherwise be destroyed. Sites of national importance need to be preserved and maintained and the flow of information to the National Antiquities Files should be maintained by the setting up of some kind of effective Department of Antiquities to coordinate the present unsatisfactory situation which is dependant on a few non-tenured expatriate archaeologists working in various institutions. But to institute changes there must be pressure from Papua New Guineans through government channels, which inevitably takes time. There is sufficient evidence now to show that Papua New Guinea has a very rich prehistoric heritage, in which considerable technological achievements and unique adaptations to local conditions can compete with any other prehistoric record for world recognition. Straightforward accounts of the main results are beginning to appear for use in school curriculae (Egloff, B. and J., 1978) and young Papua New Guineans can be proud of their heritage as stated in their Independent Constitution and can build the achievements of their prehistoric past into planning for their national future.

### Abstract

This article provides a brief general survey of the position of prehistoric research and its aims within Papua New Guinea. The author tries to show the practical value of various approaches that can be used in the reconstruction of the prehistoric record, apart from the purely archaeological approaches involving field-work, excavation and analysis. The unique opportunities to utilise the potentials of oral traditions, historical sources and the rich ethnographic material must be fully exploited.

A fairly comprehensive bibliography (to mid 1978) is intended to provide the most accessible sources that are available for further details of the actual results and research that has been published so far.

Radiocarbon dates from archaeological sites in the Highland chain indicate that hunting and gathering communities were exploiting these mountain environments back at least to 26,000 BP and that horticultural practices began to affect the landscapes by about 9,000 BP. Only in a few well-documented instances does the prehistoric record from the island and coastal sites stretch back farther than about 3,000 BP and much of this more recent prehistory is assisted by studies in language and oral tradition. The great potential of prehistoric research in the development of a unique and independent history of the newly developing country is emphasised.

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# Fitting models and studying process: some comments on the role of computer simulation in archaeology

by JAMES DORAN

## Introduction

Computer simulation techniques have long been widely and successfully used in engineering and operational research contexts, and they have been frequently experimented with, if with rather less success, in the social sciences. It was therefore inevitable that they should come to be tried in archaeology, particularly given the prominence in much fashionable archaeological thought of system and process concepts.

The suggestion that computer simulation might prove useful in archaeology was first made by the late David Clarke in his pioneering work *Analytical Archaeology* (Clarke, 1968). The suggestion was repeated and elaborated by Doran (1970) and Whallon (1972) and serious simulation projects were initiated in a number of centres, mainly in the United States. However, rather little of real substance had been published by the time that Doran and Hodson (1975: 306) commented:

'The established value of computer simulation techniques in other fields . . . suggests that such techniques have archaeological potential. But it must be admitted that there is virtually no direct evidence in support of the suggestion.'

Since those words were written a variety of interesting archaeological simulation studies has been published. A number are collected together in Hodder (1978). Here I shall briefly discuss a representative selection of them, try to identify the main problems that are arising, and try to see just how important these problems are.

## The essence of computer simulation

Put at its simplest, computer simulation is the technique of relating the behaviour of a relatively complex dynamic model programmed on a computer to the behaviour of some even more complex target system. The intention may be either to

gain some understanding of the functioning of the target system, or it may be to discover how to modify or to manipulate that system so that its behaviour is in some way improved. It is of the essence of a simulation that the passage of time within the model may be related to the passage of real time: I exclude from consideration Monte Carlo studies where random trials are used to ascertain some pattern of behaviour, or merely some frequency distribution, without there being a model which is 'run' through time.

It is easy to enumerate the standard stages involved in a simulation study: initial formulation of objectives, formulate model in outline, collect relevant data from the problem domain, program the model, debug the program, validate the model, and so on. However, there are some broad considerations which seem to apply specifically to archaeological work and which it is worth noting before looking at particular studies.

In archaeological work it is almost never the case that the goal of the simulation is optimisation or control of the target system: rather a model is sought which will serve as an *explanation* for some set of observations. Preferably the explanation will be derived from some general *theory* of relevant phenomena. Essentially we want to be able to say: 'Yes, these general mechanisms do give rise to realistic detailed behaviour when applied to this specific context'.

This implies that the stages in a typical *archaeological* study should be as follows:

(a) Collect together the covering laws/plausible ideas/*ad hoc* guesses at general rules, which are to provide the basis for explaining the observations;

(b) Put together and program the model. As far as is possible the programming language used should conveniently accommodate the conceptual content of the model (e.g. a 'systems' model is conveniently expressed in DYNAMO). The detailed micro-structure of the model will have to be filled in by a combination of archaeological observation (i.e. what actually happened) where possible, supported by not too implausible *ad hoc* rules where there are no observations. Similarly, environmental variation (e.g. rainfall) will have to be either observed (however indirectly) or guessed;

(c) The model is validated. This means establishing that the model as a whole *can* reproduce the detailed observations which are the target of the study. This validation process requires that the model be run repeatedly so that (i) the effect of random variation (the model is almost bound to be stochastic) and (ii) the effect of varying model parameters, can be fully assessed. It should be obvious that we want to know *all* the ways in which the model can be persuaded to mirror the target behaviour *and* something about the other behaviours which it may produce. This doesn't necessarily mean massive systematic experimentation: a few simple soundings of the model's behaviour *may* be sufficient especially if its overall structure is relatively simple;

(d) Draw conclusions. A simple conclusion is: 'No way can this model provide those observations'. But it may be obvious how the model needs to be improved. Alternatively the model may be able to reproduce the observed behaviour (maybe in a variety of ways) in which case one's enthusiasm for the mixture of ideas, laws and guesses which went into the model will be raised. Again improvements may be evident. Certainly the successful validation of a model will never establish that the ideas that were built into it were 'right'.

I have deliberately made the whole simulation procedure sound pretty heuristic and non-rigorous. I believe that that is the way it has to be – though it is true that in validation, for example, tests of statistical significance can be useful provided they are used heuristically, to give objectivity to assessment, rather than followed blindly.

### **Some recent archaeological simulations**

Now to look at a selection of recent simulation studies, and to try to assess them against the background of the foregoing remarks. I shall not be concerned with questions of archaeological detail however important these might be in the context of a particular piece of work. It is the broad issues of method, and the overall impact of the studies, that matter here.

Much of the recent work has concerned, in one way or another, settlement patterns. The aim is to simulate the mechanism by which settlements (or sites) are located, vary in size and interact with one another, and disappear – all in an environment which takes into account topography, plant and animal resources, and climate. Naturally the origins of the models lie in general theories of carrying capacity, resource utilisation, location analysis and the like. However these theories tend to be pretty fuzzy. The details of the models have to be filled in with *ad hoc* rules (for example those determining population changes from year to year) which are plausible as summary descriptions from an archaeological or anthropological point of view and, if possible, can be shown to be compatible with relevant archaeological data. In settlement studies the basic archaeological data is likely to be the actual locations of settlements in each of a number of successive time periods, backed up by estimates of settlement size, estimates of natural resources, details of topography, and so on. The goal is, in line with the discussion of the last section, to discover general laws or principles which will go beyond existing theories of location and which form the theoretical backing to this whole class of settlement simulations.

Hodder (1977) has published an initial study of Bandkeramik settlement in Central Europe. This is *not* a computer study, but a hand simulation which could easily have been programmed. The study fits easily into the pattern sketched above but is very simple. All that happens in the model is that the number of settlements increases from one phase to the next (four phases are considered in all) and that the locations of new settlements are determined, settlement locations in phase 1 being



taken from the archaeological record. A simple deterministic rule ('logistic growth curve') specifies the increase in the number of settlements and a simple stochastic rule the locations of the new settlements (related to the locations of supposed parent settlements). Hodder demonstrates that each of these rules is more or less compatible with the available archaeological data.

The validation of Hodder's model requires him to compare the actually observed settlement locations in his archaeological phases 2, 3 and 4 with the range of settlement patterns for those phases which could be generated by his simulation model. In fact, he reports only one trial of the model and considers merely the patterns generated by that – taking no account of the very large and arbitrary random element in any such single run of the simulation. This is a serious limitation which a more substantial computer study (now under way – Hodder, personal communication) would have avoided. In passing, it is worth noting that this model is little more complex than random walk models for artifact dispersal – Monte Carlo studies in essence.

Hodder was well aware of the simple and preliminary nature of his model and of the very many potentially relevant factors of which it took no account. Zubrow (1975) set out to be much more ambitious. His model of settlement dynamics in Hay Hollow Valley, Arizona, combined settlement numbers and locations, population size and carrying capacity, migrations, natural resources and micro-environments and was backed up by detailed study of the actual settlement remains and by an elaborate attempt to estimate prehistoric environmental resources. However the work was less impressive than this summary description would suggest. Many of the details of the model were simple and unconvincing, the estimates tenuous, and the overall approach rather muddled and perhaps unduly influenced by then prevailing views on the importance of explicit scientific method (which doesn't combine too well with simulation work). Zubrow also failed to do anything like enough experimentation with his FORTRAN simulation model once he had finally debugged it, apparently being content to achieve reasonable behaviour and leave it at that. There is no mention in his report of how far variability in the model's behaviour was attributable to its random elements rather than to adjustments made to the model parameters. Zubrow himself comments (page 103):

'Obviously, this series of simulation runs is not a complete analysis, but given the limitations of time and money, it was sufficient to demonstrate the heuristic value of the simulation model.'

After so substantial an archaeological and programming effort it is a pity he could go no further.

The model of hunter-gatherer subsistence and settlement (in this case 'camp' might be a more appropriate word) location expounded by Jochim (1976) is not a simulation but could fairly easily be extended to be one. I include it partly because it is broadly relevant and interesting, and partly because I see it as a development of the

earlier actual simulation study of Thomas (1973). At the heart of Jochim's model is the idea that hunter-gatherer bands have to make *choices*. They have to choose which natural resources to exploit, which sites for their settlements, and how to divide up their population so that the exploitation of resources is substantially effective. These choices are made in the furtherance of *goals*, and in the light of *information* about the location and movement (seasonal) of resources, about topography, about climate and so on. Jochim's model, which is worked out in considerable detail, is essentially a decision rule constructed to reflect the supposed goals of the bands. It selects a pattern of resource utilisation, and corresponding settlement locations (it incorporates a simple gravity model) from the information given to it about resources and their movement. Since the pattern of resource availability varies with the season, so does the pattern of exploitation and settlement location. Joachim tests his model against the archaeological record in a particular context (Mesolithic – upper Danube region of S.W. Germany) and argues that the surviving site remains are quite closely consistent with the predictions of his model.

A computer simulation model could be derived from Jochim's work simply by applying the predictive model repeatedly over, say, a period of a few hundred years. Assuming that there were slow changes in resource availability and climate the pattern of settlement would itself slowly change. The validation of this model would, of course, be very difficult since it would be well nigh impossible to separate surviving sites chronologically. A more interesting, but correspondingly even more difficult to handle, extension of Jochim's work would have the resources in one year influenced by the degree to which they were exploited in the preceeding year or years – this feature was present in a very limited way in the work of Thomas cited earlier.

Distinctive features of Jochim's work, are first his use of the concepts of choice and goal: in effect he has greatly elaborated and perhaps made much more realistic the rules determining settlement location. Second, unlike Zubrow, he has taken into account the distribution and fluctuation of resources. The first of these developments seems to me to be the more important one: it introduces the concept of entities (here hunting bands) which take decisions based on potentially faulty and incomplete information. It is not at all clear whether or not there are distinctive behavioural consequences of this approach for inter-group behaviour: there certainly are for the behaviour of the individual. I shall return to the importance of simulating decision making later.

The study, by Wright and Zeder (1977) is quite different in character. Their intention was to explore the implications of a specific idea – that some of the apparently non-utilitarian 'ritual' items exchanged in a simple trading system in fact serve an important control function. They suggested that such items are regulators which permit appropriate production levels to be fixed and so enable the system to withstand sharp fluctuations in populations and therefore demand.

Wright and Zeder formulated a simulation for a linear string of settlements whose population varied according to simple stochastic rules (not intended to be

particularly realistic). They arranged for each of the two extremal settlements to produce both a utilitarian commodity and a non-utilitarian 'control' commodity. They explored the effect of different exchange rules and different production control rules on the behaviour of the exchange system as a whole. After initial failures they devised a set-up which proved reasonably stable – simpler formulations displayed destructive positive feedback.

A striking feature of this study is that there is no attempt to fit real data: it is entirely a matter of devising a system which will display stability within constraints on its nature determined by a broad and uncertain understanding of exchange systems in general. And it is not at all clear that the system simulated embodies the only mechanisms which will yield stability – if anything, one is left with the impression that there are many such mechanisms.

Finally, Hosler, Sabloff and Runge (1977) have recently published a simulation model of the Classic Maya collapse. Theirs is a systems model which uses the conceptual resources of the Forrester/Meadows 'world' models and like those models is written in the dedicated programming language DYNAMO. The programmed model (derived from a more comprehensive but less precise verbal model) focuses on a couple of positive feedback loops and involving a small number of variables (number of commoners, food production, monument production etc.) and their interaction. As with the Wright and Zeder work, the objective is to demonstrate the right kind of behaviour – the collapse of the civilisation – there is no attempt at detailed validation. The objective is broadly achieved, but again there is no reason to believe that this is the only model structure by which collapse behaviour might be obtained.

## Assessment

There is a striking variation in the studies which I have described. Not only do they differ in complexity but also in conceptual content and objective. This reflects partly the early experimental character of archaeological simulation work, and partly methodological and conceptual uncertainty in archaeology as a whole especially surrounding the topic of culture change. It is noteworthy that three of the studies, those of Zubrow, of Jochim, and of Hosler, Sabloff and Runge, offer models which are claimed to be systems models but which are nevertheless quite unlike one another. None of the models presented are, or could naturally be formulated as, queueing models: models structured in terms of queues and the service of queues. This is so although much computer simulation work does use queueing models and the specialised programming languages developed to support them.

The study of Zubrow is the most substantial integrating a determined methodological stance, a significant amount of computation, and a laborious attempt to use the archaeological data effectively. Jochim's work, although stopping



short of an actual simulation, is similarly methodologically innovative and archaeologically substantial. But each of these studies has attracted considerable archaeological criticism and errors have been detected (as regards Zubrow see Dumond (1976), Zubrow (1976) and Dumond (1976a), as regards Jochim see Binford (1978)). The other three studies are much less substantial and have correspondingly less archaeological potential. There is still not much solid archaeological success to the credit of simulation work.

Recurring problems are difficulty in obtaining sufficient reliable and unbiased data to establish and validate models, and a deficiency of computing expertise and facilities. Archaeologists' lack of computing experience, and lack of easy access to computing facilities, seem to me to be problems which will be overcome relatively quickly. A substantial proportion of archaeological students now learn something about computing, and many centres have acquired their own remote terminals or small machines.

The shortage of good data looks less tractable. Even if we suppose, as is perhaps reasonable, that the collection of archaeological data could be more consciously directed toward the needs of simulation work, it is still difficult to believe that the more interesting and complex simulation models could often be validated in detail. Does this mean that simulation work has a strictly limited future? Such an assertion might miss a crucial point. Computer models can usefully be used to study the behaviour of processes of likely cultural significance without requiring detailed validation in some particular archaeological context. There seems to be an analogy with cognitive science work in which possible structures for cognitive processes (such as object recognition, problem-solving and learning by generalisation) are explored, and effectively so, by posing challenges of the form: 'Here is a kind of cognitive behaviour which people display in this sort of situation. Build me a computational model, not too *ad hoc*, which can replicate it'. In the remainder of the paper I shall elaborate a little on the idea that a relatively data-free computational study of process can be useful for archaeological and anthropological problems.

### **The Study of Process**

From a computing standpoint, one of the more prominent aspects of the present crop of simulation studies is how easy it would be to elaborate the actual programs. For example, I can see no great difficulty in combining the Zubrow and the Wright and Zeder programs to obtain one which relates trade to settlement patterns in some arbitrary but perhaps not too implausible fashion. However such a program could certainly not be derived from actual archaeological data nor validated against it. So at first glance it seems useless – no more than a toy.

But the instant dismissal of all such exercises is too hasty. After all, the avowed purpose of the Wright and Zeder model of a linear exchange system was to



demonstrate a certain class of behaviour (stability) by the use of a particular kind of process. There was no attempt to match with real data. The model of Classic Maya collapse was similarly motivated: the idea was to demonstrate that a certain kind of large scale behaviour was inherent in a certain set of variable interactions. Again it was not felt appropriate to validate the model against real data.

So it appears that there is already another acceptable format for an archaeological simulation which can usefully be distinguished from that I laid out earlier. It is one in which the study of process is dominant without any attempt to fit a model to detailed data. Given certain broad phenomena (e.g. urbanisation, the growth of a particular settlement, the development of long distance trade routes) the objective of the study is to demonstrate that a computer simulation put together in a broadly plausible way (no doubt reflecting some particular approach to the explanation of urbanisation or whatever) *will* or *will not* display the requisite behaviour. The value of this type of study is not only that it can produce some definite answers (*this* gives the required behaviour but *that* doesn't) but also that it forces the relevant theory to be made more precise and computationally operational. It may or may not be a disadvantage that there will inevitably be a considerable narrowing of focus.

Let me now try to make these ideas a little more definite by looking at the problem of the origins of 'gateway communities'.

### **Gateway communities**

Hirth (1978) has recently published a study of prehistoric 'gateway communities' (he refers his discussion to a particular Middle American context but this is irrelevant here). He contrasts this concept of a gateway community, a settlement which occurs at the entrance to a trade 'bottleneck' and whose service area is structured as an asymmetric 'dendritic' network, with the established notion of a 'central place' – a hierarchically dominant settlement at the centre of a symmetrical and compact service area. He asserts that:

'Gateway communities develop either as a response to increased trade or to the settling of sparsely populated frontier areas. They generally are located along natural corridors of communication and at the critical passages between areas of high mineral, agricultural or craft productivity; dense population; high demand or supply for scarce resources; and at the interface of different technologies or levels of sociopolitical complexity. They often occur along economic shear lines where cost factors change and where there are economic discontinuities in the free movement of merchandise.'

and later enumerates some of the things that can happen to gateway communities:

'Competition from hinterland central places may generate one of a number of

predictable changes:

(1) The gateway community will lose portions of its original hinterland and will undergo an economic decline regressing to a level concomitant with that of its new competitors . . .

(5) It may evoke more complex forms of sociopolitical activity with which to combat increased economic competition.

It is this last response that carries the greatest potential stimulus for cultural evolution. An increase in political authority and militarism on the part of the gateway community could lead to an elimination of competition through hinterland conquests.'

Unfortunately this theory of gateway communities badly lacks precision. And it rests for such plausibility as it has upon an appeal to the reader's subjective intuitions about population growth, trade, economics, militarism and so on. Would it be possible to construct a computer simulation model which would computationally demonstrate the rise and maybe decline of gateway communities on the basis of a few broad and plausible principles built into the simulation?

Certainly the first step would be drastically to reduce the range of complexities being considered. So let us suppose that the idealised data initially given to the simulation program consist of the locations of a random but relatively even scatter of small settlements over a region, together with a specification of the locations of a number of 'natural barriers'. The point about a natural barrier is that it has extent and no trade route can cross it. The requirement is that for *any* such initial setting the model will exhibit the development of a few of the settlements into large gateway communities in plausible locations (see Fig. 1). Ideally, of course, the model's behaviour would match in detail against a number of known regions and periods, but that strong requirement has been dropped.

One possibility is to write a program which merely looks at the initial configuration of settlements and barriers and locates gateway communities in plausible places but with no attempt to follow through a process of development. Essentially such a program would imitate a locational analyst predicting where such communities are likely to arise. This is a kind of pattern recognition exercise and not a very easy one. There would be no simulation model as I am using the phrase. So having noted the possibility I move on.

Consider now what I shall call a *production, distribution and population model*: a model which is a combination of some aspects of the Zubrow and the Wright and Zeder models discussed above. Model components could be:

(a) each settlement produces its own range of commodities which are in demand, and which are allocated, throughout the region. Allocation reflects demand but larger quantities of commodities tend to be allocated to more populous settlements which are near to the producer;

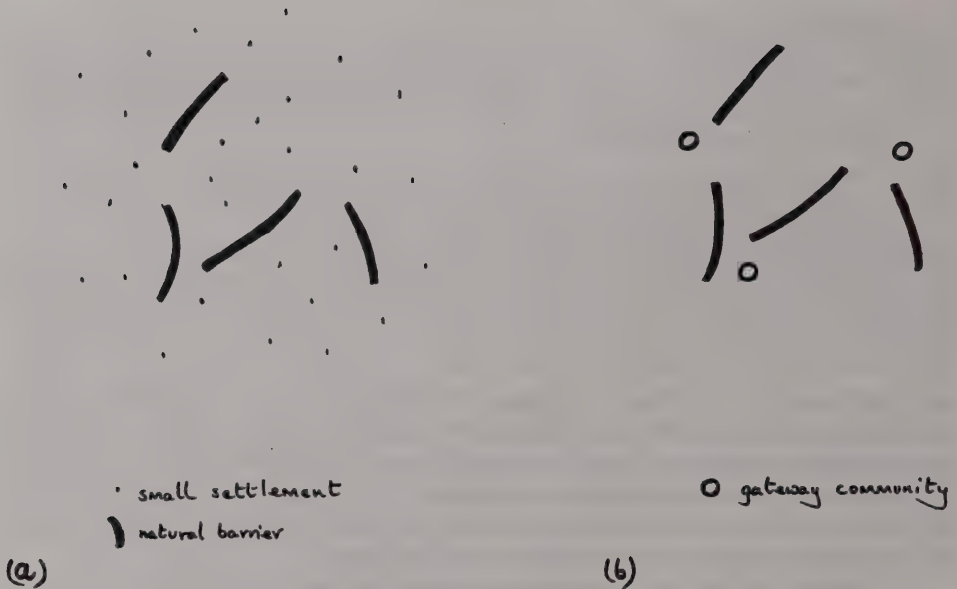


Fig. 1 The essential behaviour required of a simulation model intended to explore the trading origins of 'gateway communities'. Given a region in which there is initially a random scatter of small settlements together with a number of impassable 'natural barriers' (a), the simulation must exhibit growth concentrated in some of the settlements located at 'bottlenecks' (b).

- (b) commodities are transported from one settlement to another via a chain of intervening settlements without crossing 'natural barriers'. Shorter chains involving more populous settlements are preferred. No settlement will pass on a commodity which it needs itself;
- (c) the production of a settlement depends upon its population size and commodity inflow;
- (d) the population size of a settlement fluctuates randomly but tends to increase if its requirements for commodities are usually met.

It should be clear that the central and very simple idea is that in a situation where commodities are being moved over long distances, settlements whose location ensures that large quantities of goods will be routed through them will easily satisfy their own needs and tend to grow.

This outline model, if detailed, would form the basis for a computer simulation. As the simulation was 'run' there would be simulated a development of population, trade and overall settlement pattern in the region. Notice that because there are chance elements in the model, the pattern of development would vary from trial to trial (apart from differences caused by varying parameters of the model). Thus the set of gateway communities obtained (for those variants of the model giving rise to

gateway communities) would not always be the same, although no doubt certain locations, determined by the barriers, would tend to prevail.

It should be possible to get a computer simulation model along these lines working without too much difficulty. I believe that its behaviour would be of some real interest especially if the model details could be elaborated in a reasonably realistic way. However, rather than pursue that elaboration I want to look, again very briefly, at a rather less superficial kind of model in which the notions of *decision* and *competition* are central.

### **A settlement competition model using decision processes**

Consider the following *settlement competition* model. Each settlement attempts to improve its well-being by repeatedly *deciding* what action to take given a range of alternative possibilities. Each decision requires an assessment of the likely outcome of the possible actions. This emphasis upon decision is directly analogous to the hunter-gatherer choice embedded at the heart of the Jochim model sketched earlier. Since the settlements are in competition for resources and products one settlement's gain is liable to be another's loss.

The notion of settlements 'deciding' and 'assessing' may seem a little too artificial. I think not. The intention is merely to model settlements *as if* they were structured for decision taking, on the grounds that their overall behaviour usefully bears this interpretation.

To further specify the model one might proceed as follows. There will be some general components which relate to the entire region rather than to individual settlements: chronological trends in population and technological productivity, sub-regions suitable for different types of production, migration perhaps with a tendency for people to move from poor to rich settlements. Within this general framework each settlement has its own demand pattern for products of the region and is seeking to maximise its total consumption. In pursuit of this ultimate goal it distributes its working population between three main activities *production*, *trade*, and *alliance-conquest*. This distribution, along with the settlement's total population, demand pattern and so on, varies through time. The size of the population allocated to an activity imposes a basic constraint on the magnitude of that activity.

The production activity must yield a range of products to be traded. Typical decisions concern how much of each product to manufacture, and when, in the light of resource and trading considerations.

The trade activity has the task of distributing the settlement's own products and obtaining from elsewhere the products the settlement needs and cannot itself produce. Trade is pursued to the settlement's best advantage, and may involve obtaining and redistributing goods 'just for profit'. Clearly there are very many detailed possibilities for a model drawn from the whole domain of primitive econom-



ics. According to which particular form of exchange or marketing is envisaged, different kinds of heuristic decisions will be required of the settlement. Finally there is the alliance-conquest activity. The idea here is that a settlement may decide to pursue its goals either by seeking to dominate other settlements (in which case, if successful, it takes decisions for its conquest in its own interests) or by seeking to ally itself with them (in which case decisions are taken jointly). It is thus possible for composites of settlements to be formed within the model in a relatively natural way.

Thus the core structure of the elaborated model is the allocation by settlements of their population resources between three main activities together with subordinate decisions within each of these activities. Clearly the model must have sufficient structure for the outcomes of decisions to be plausibly established and fed back into the appropriate settlement decision processes.

Perhaps the most important thing to be said is that it *would be* possible to program such a model for a computer. There is nothing outlandish in the idea of computational modelling of decision processes. But would such a model be useful, bearing in mind just how arbitrary and unrealistic many of the assumptions built into it would have to be? I suggest that the exercise would be worthwhile provided that the model itself were structured consistently and in such a way that the overall pattern of development in the idealised region could be related to the characteristics of the heuristic decision making process and in particular to the dependence of that process upon a settlement's incomplete and often inaccurate knowledge of the behaviour and resources of the other settlements around it.

Gateway communities would flourish (presumably!) because emphasis upon trade would pay off well in gateway locations. This is much the same mechanism as was embodied in the simpler model sketched earlier, but now appearing as a by-product of more fundamental mechanisms.

There are some important computing considerations. The settlement competition model is of sufficient complexity for it to be virtually essential to choose a programming language, and to structure the actual program, so that the conceptual structure of the model is easily expressed. Now, at the heart of the model is the idea that the settlements, although independent and acting in competition, have the same abstract processual structure and that this abstract structure is a decision making structure. This implies that the computational representation of the model should require the interaction of multiple processes which are conceptually running in parallel and all of which are instances of the same process schema. A programming language which comes close to this requirement is SIMULA-67. However SIMULA-67 has its limitations and programming languages now being developed may prove more suitable. That the design of the schema should draw upon what is known of structured decision making from computer based cognitive science work poses a further challenge for computer scientists.

Finally, to return to the main issue, it is surely the case that no settlement competition model of the kind I have sketched could possibly be validated against

detailed archaeological data. Rather the model will be useful if a characterisation of the behaviour which it displays can be productively related to the particular process which it embodies. Computer simulation is needed to handle the great complexity of the relationship to be explored.

## Acknowledgements

I am grateful to Ian Hodder and Roy Hodson for helpful criticisms of an earlier version of these comments. They are, of course, in no way responsible for the deficiencies of this version.

## Abstract

A number of recent archaeological computer simulation studies are contrasted and their individual and joint limitations considered. The likely future of such work is discussed including the utility of simulation studies *not* validated against detailed archaeological data. An example problem, the origins of 'gateway communities', is considered in some detail.

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# Style and regional grouping in Magdalenian cave art

by ANN SIEVEKING

The Magdalenian is the stage of the European Upper Palaeolithic that is richest in mural, or cave, art, but paradoxically it is perhaps the least easy stage in which to define regional groups. This uniformity appears to be a characteristic peculiar to the art; it is not reflected in the bone and stone industries of the period which show considerable regional variation.

There are a number of ways in which Palaeolithic art groups, whether chronological or regional, may be distinguished. For example by content, in the choice of a particular inventory of animals and the occurrence of certain signs, or by the techniques used – sculpture, engraving and painting, used separately or together – or by the use of particular colours and of flat wash, or other methods of shading. The association of certain elements within the inventory, such as bison and horse with claviforms, provides another means of grouping as does positioning, whether it is individual, (for example an animal drawn vertically), or within the context of the cave, for example paintings clustered in niches or arranged in central panels. Lastly naturalistic paintings and engravings may be grouped by style. To do this one first needs some criteria that are convincing to demonstrate the similarities between examples on which the groups are based. In fact such similarities must be demonstrable. Style is an inexact word and to say that two Palaeolithic figures are stylistically alike is an apparently subjective judgement: it is tantamount to saying that, to the observer's eye, these drawings of two bison from different caves look alike, (though they may not to another viewer). However, if style were defined as the proportional relationship of lines in a drawing, the term might be more acceptable as a criterion for grouping drawings. Obviously, colour and wash in a painting and depth of line and detailed shading in an engraving are all aspects of style but they are not as demonstrable as the length, position and importance of one line vis-a-vis another. How eye, beard, horns and ear are placed in a drawing of a bison's head are simply a matter of positioning and different positioning, that is a greater or less distance between horn



and beard, between eye and base of horn etc., will alter the aspect of each head. This relationship in distance and proportion is a measurable parameter and in fact the whole matter of visual similarities in Palaeolithic figures may be approached mathematically. De Lumley (1968: 123) took a number of selected distances on a bison's body: i.e. base of horn to tail, shoulder to front hoof, base of horn to tip of beard etc., as variables and plotted eight examples. He was trying to find a module for the construction of known Magdalenian figures and to prove that an undated single engraving found east of the Rhône, at Ségriès, belonged to this group. The method could be adapted to find groups of figures with similar proportions, and such a mathematical ascription could, of course, be repeated by different people. It should, however, preferably be used as a check to recognitions made by eye, rather than a replacement, as it is a comparatively insensitive method.

In this paper the judgement of similarities is made visually, but when a particular figure is claimed as similar in style to another the assertion is that the proportional balance of lines and distance between lines in one is comparable to that in the other. The line may be thicker, or thinner, the painted animals may be in a different colour, or differently shaded, but that is not fundamental: by style what is meant is the positioning of the component lines that build up the figure and in Palaeolithic paintings and engravings this is made easier by the fact that the drawings are principally in outline.

The establishment of regional grouping in Magdalenian art demands that the art evidence is used in an archaeological manner; the representations of animals and signs are regarded simply as categories of objects observably related to one another, or distinct, as the case may be. The meaning of the art is not relevant to this end nor, except as a repeated complex, is the layout of caves. Chronological grouping has long been established for Palaeolithic art by Breuil and others; it is in fact much easier to recognise than any regional grouping, although this is a fact that seems quite at variance with most ethnographic observations. Generally speaking modern or relatively modern primitive people are found to have art forms that are tribally (and thus usually territorially) distinct, but this seldom applies in the Palaeolithic and most particularly does it not apply in the Magdalenian. Before this stage there are local regional differences and over a wide area, taking in Italy, Spain and Russia, one may find geographical differences even in this period, but in the context of Franco-Cantabria, in the Magdalenian, the regional differences are only of a minor degree.

On the analogy of a tree, one might have expected that the distribution of Magdalenian art, starting from a common root and trunk, would divide geographically into large branches, with twig-like variations at the summit, but in the Magdalenian the branch stage is missing and major regional groups do not exist. Michel Lorblanchet's study of the art of Quercy (1974), endorses this point. Quercy is a distinct geographical region and Lorblanchet divides its decorated caves into two principal chronological groups, the first group, which includes Pech-Merle and Cougnac, spans the period from Perigordian to early Magdalenian. The caves in this

group have, in his opinion, a typically local character. The second group including Les Escabasses and St. Eulalie he simply describes as 'plainly Magdalenian'. These later caves do not perpetuate the styles of Cougnac and Pech-Merle but conform to the tradition of their period in Central and Western France as a whole. Here at this stage a 'chronological' style is dominant over any local tradition and this pattern holds generally throughout the Franco-Cantabrian area. For example, one might expect Asturias (the province around Oviedo in N. Spain), which is the most westerly group in Magdalenian art, to have developed some regional variations, but it has virtually none; except in degree, for example in the proportional importance of signs, it conforms to the current pattern. This is not to say that the decoration of caves in all these areas is exactly similar, but the differences are not major, they are trivial, rather than substantial; the methods of painting, the conventions of depicting an animal's coat, the inventory shown and the layout of the caves remain fundamentally the same. In fact as great a difference often exists between two neighbouring caves of similar date as between two caves in different geographical regions.

At this point one may categorise the evidence that exists more systematically. West European Palaeolithic art is usually divided into, and discussed in, two separate categories. The first is mural art, consisting of open-air rock shelter sculptures, open-air or shallow cave sites decorated with engraving (and/or, very rarely, painting), and deep 'sanctuary' caves with painting, engraving and, very exceptionally, sculptures in mud. Mural art may be difficult to date and elusive in meaning but its location is unassailable. It is fixed to the wall where it was first made and in a distributional study, this is very reassuring. The second category of Palaeolithic art is, from this point of view, not so reliable. This is the group variously called Art Mobilier, mobiliary, portable, chattel, domestic or miniature art. As these names suggest one should perhaps only regard the find spot of any object as its final resting place rather than its original location. The small size of many pieces endorses their portability. They could easily have been exchanged, traded or simply carried from one place to another and the distribution of certain groups of these objects suggests that this is what happened. (Sieveking, 1976: 583). Miniature art pieces are thus less simple to use in a regional study than is cave art, and they are not under discussion in this paper.

In making any assessments about connections, grouping or similarities, it is relevant to consider the possible proportion of Palaeolithic art remaining today, as compared to the probable original quantity. What we now have is obviously not at all representative of the original proportional bias. For example, probably a relatively high proportion of deep cave sanctuaries have survived, while virtually all open-air paintings and engravings have disappeared. Probably many of the small portable objects were made in perishable materials, such as wood for carving and perhaps leather as a surface for painting and it seems reasonable to suggest that about 5% of the portable art pieces remain and perhaps the same percentage of mural art. It is not a very good sample to build distributions upon and not only is it a very small

proportion but the remaining examples represent the original incidence very unequally. In fact, the maturity in execution of the examples that remain, as much as the rigidity of the representational canons to which these vestiges belong, can probably only be explained by allowing for vast quantities of missing material: Leroi-Gourhan makes this point repeatedly, that it is not possible to account for the uniformity of the figurative traditions and their widespread distribution without including something other and more than the vestiges that remain. He insists that the small number of caves that we know is not adequate to explain how, during the 10,000 years that separated Lascaux from Limeuil, for example, the visual conventions were transmitted in a regular and ordered evolution, over a very wide area.

If you consider the time involved, taking 15,000 years as a very conservative estimate, (from 25,000 to 10,000 bp) and compare this with the number of caves, which for France is 133, according to the latest count, (Naber, Berenger, and Zalles Flossbach, 1976), this allows less than one cave for each century. In fact probably more than half the caves belong to the Magdalenian period, which makes the latter part of the record more coherent, but the earlier even more discontinuous. In Spain there are only 72 caves, (Naber, *et al. op cit.*) a number which distributed in a uniform manner allows one decorated sanctuary for every two centuries. To bias the allocation in favour of the Magdalenian might give one cave to each century in the latter part of the record. However this can hardly be a realistic picture of the original density, for it is extremely unlikely that an art tradition can be kept alive if a new example is only created every fifth or tenth generation. For an art tradition to persist it must be practised and although one may argue that sanctuaries are not only of the moment in which they are created, but have a continued existence, like a church, the number we have left still suggests that the record is extremely incomplete. As for the continuing use of sanctuaries there is little evidence that deep caves were ever much frequented. If the figurative tradition was kept alive and if the images from which it was made up were familiar to Palaeolithic man, then deep sanctuary caves, which form the greater porportion of the caves known to us, did not contribute much to this.

Having said that regional differences in Magdalenian art are minor in degree one may demonstrate this by showing how strong are the major similarities between different regions in a presumed single period in comparison with the differences in detail that do exist. The character of Magdalenian art reinforces this position for this is the period, particularly in its middle and later stages, in which all the art forms reach their most uniform and formalised appearance and to which most examples, either mural or portable, belong.

As is well known, the content of mural art is restricted: the naturalistic animal art comprises large herbivores, mainly bison and horse, a few felines and birds and a number of anthropomorphs. In addition there is a considerable corpus of signs. Within the span of the Upper Palaeolithic the relative proportion of animal species depicted varies from cave to cave, though generally, (and particularly in the Magdalenian), observing the dominance of bison and horse, but one cannot find a



significant geographical patterning of species, nor does their distribution seem to be related to climate. It has often been claimed that Reindeer is conspicuously absent in Cantabrian caves, but there are quite a number of reindeer drawn here (Barandiaran, 1969), the best examples from relatively newly discovered caves, such as Monedas, Tito Bustillo and Altxerri, and its presence in Périgord or the Pyrenees, although more common, is very erratic compared to the faunal record.

If the proportional representation of animal species drawn in caves of accepted Magdalenian date does not show any geographical significance, then perhaps the association of species, or of particular animals with particular signs, may. To talk about grouping of animals and symbols is really to talk about layout and spatial design in caves, a field of study to which Leroi-Gourhan has contributed much in the last decade. If one accepts that his theories on the preconceived spatial planning of cave decoration are convincing, (these are his observations concerning the repeated and observable structure of panels on a wall and the positioning of central and peripheral animals in these), one should differentiate these hypotheses from his interpretation of cave art as a binary opposition of male and female elements, an observation that is much more controversial. Accepting then, that there is a pattern in layout, as in content, here also the combinations or juxtapositions of species are very consistent. The same 'fan' structure with central horse and bison, flanked by caprids and completed at the topographic limits by carnivores – to put it very simply – is found in the caves of Cantabria, the Pyrenees and Central and Western France. Signs, however, do show some regional grouping. The quadrangles of Lascaux and Gabillou do not occur in quite the same form outside Périgord, the whiskered boxes of Buxu and Tito Bustillo do not occur in the Pyrenees or Périgord, but claviforms occur everywhere, although in greater quantity in the two more southerly regions, (Pyrenees and Cantabria). However, since many signs show a developmental relationship with one another, one must take care not to confuse a chronological evolution with a regional distribution, more particularly as all periods of Palaeolithic art are not equally represented in all regions.

The particular use made of the topography of a cave is again consistent throughout the Franco Cantabrian area, rather than being regionally determined. In Cantabria some of the most beautiful paintings are grouped in niches, or rather bowl-shaped hollows in the galleries. For example there is the *camarin* at Peña de Candamo and a smaller dome in the ceiling of one gallery in La Pasiega. A similar feature is used in Le Portel in the Pyrenees and in Font-de-Gaume (Périgord) where it is covered with a ground of red paint. This again is a universally used device, the whole wall at Tito Bustillo (Asturias) is prepared in this way, (as it is at Gargas in the Pyrenees), and one may cite many more examples of either of these features. When the natural structure of the subterranean galleries does not provide water-worn cupolas in the ceiling, paintings and engravings are tucked away in such niches as may exist, (for example in Les Trois Frères and Bédeilhac in the Pyrenees and Monedas, Santander). However, there is nothing in the Pyrenees or Périgord quite like the



fissures decorated with tectiforms that occur in Cantabria at La Pasiega, for example, or in Castillo and Altamira, nor a cave like Las Herrerias which has nothing but signs; this last is a very extreme case of a difference in degree of importance given to a widely used form.

If one agrees with Leroi-Gourhan's thesis that each cave is decorated to a pre-determined plan and that the animals depicted are more a mythogram than a dietary inventory, you will not expect much variation in content or layout: however, you may still look for similarities or divergences in style. Over 15,000 years it is unlikely that, save as an exceptional case, any cave that we know was painted by the same artist, or artists, as any other. The theory that the high quality of mural art is best explained as representing a large output by a relatively small number of talented individuals whose work was in great demand (a theory recently reviewed in Bahn, 1977: 245) is not at all tenable, not because of the distances involved, which are quite feasible, but because of the time span. Unless you consider that the caves we know are confined to short stages of the Upper Palaeolithic, rather than distributed over this period, or that at present we have more than 5% of the original total, you cannot consider the same artists, (unless exceptionally), to have been responsible for painting more than one cave. Niaux, Bédouilhac and Fontanet are perhaps the only example of such an exception; there are black outline bison in these three caves, single examples only in the last two, that are so similar as perhaps to be the work of the same artist. Archaeologically the dating of these caves allows this and they are near to each other geographically, but they form, I think, the exceptional case.

If you are not accustomed to looking at paintings, the similarity in the content and layout of Palaeolithic caves makes you think that one cave is more like another than it really is. The reiteration of bison and horse tends to disguise the differences in manner of painting or engraving, but in fact these differences are infinite and every cave is individual, in spite of its restricted animal inventory and its stereotyped layout. Allowing that in style there may exist that variable that is lacking in content or layout one difficulty remains and that is to decide whether the apparent differences are regional or merely individual, that is simply the difference between one individual painter and another. It is a considerable difficulty. If one first discounts the differences that are basically chronological one may then try to see if amongst the apparently near contemporary examples there is any 'regional' character.

Various attempts have been made to do this from a technical point of view, but without conclusive results. Colour has apparently no regional importance, (Geoffroy, 1974), and while a dotted line, such as is used to outline the deer at Covalanas, is a technique more common in Cantabria, it is not confined to this area, (there is an ibex at Cougnac drawn like this). Engraving is used in all areas, both with and apart from painting, so is polychromy and although low relief stone sculpture is confined to Western France one cannot place too much emphasis on it as a stylistic group, as its distribution is apparently accidentally determined by the quality of the limestone. Similarly mud sculptures are only found in the Pyrenees: as a group they are now

unique but, since they are so vulnerable, this may be simply an accident of preservation.

In fact the differences between two caves, such as Gabillou and Lascaux, which are in the same region (Dordogne), and which are near-contemporary, are in some ways as great as any differences between caves in different regions. Lascaux is a compact chambered cave, decorated in unified compositional blocks and painted with large figures, Gabillou is a low, narrow gallery cave with little apparent compositional structure and decorated with small engravings. However in the manner of drawing they have a certain likeness that differentiates them more from caves in other regions than from other caves in their own locality. For example, they have horses with large bodies, little heads, well drawn feet on the end of short legs and all the animals, in both caves, have a more than usual sense of movement. This almost skittish suggestion of movement is more apparent in other caves in central and western France, than for example in the Pyrenees. One cannot be certain that it is only regional: it could represent a chronological stage that is missing from the local sequences elsewhere, but with that caveat one may accept it, provisionally, as a regional style. The big-bodied, neatly featured animals of Lascaux also echo the low relief sculptures of this region, particularly those of Le Roc de Sers and Angles. This is shown not only at Lascaux; Cougnac, for example, has ibexes with heavy, square bodies and small heads and they occur again at Rouffignac, Combarelles and La Mouthe. One begins to think that this also may have a regional significance, but the same square ibexes occur in Les Trois Frères in the Pyrenees: the regional distribution is exploded and in this case it is not simply exchanged for a chronological fashion. Le Roc and Cougnac are Solutrean in date, Angles and Lascaux relatively early Magdalenian and Rouffignac and Les Trois Frères rest between Magdalenian 'IV' and 'V'.

There are a number of stylistic tricks, however, that are clearly regional. These do not concern the drawing of a whole figure, but only details of it. One example is the particular way of drawing a horse's mane found in many Cantabrig caves (Pindal, Candamo, Buxu, Hornos, Tito Bustillo, etc.). In fact one or two horses in Les Trois Frères have similar 'boxed' manes and so has one horse at Teyjat, (Dordogne), but these are similar to rather than identical with the Spanish examples and this particular convention may be considered regional. So, on a smaller scale, is the use of a triangular eye when drawing a mammoth, found at Rouffignac, Bernifal and Font-de-Gaume, (Périgord). These last two caves share a very stylised type of tectiform, also. This is of interest for, although signs have a certain regional character it is difficult to classify them because, with the exception of claviforms, usually no two caves have exactly the same sign. Such examples of regional features in mural art may not be very impressive and, although they can be multiplied, one must perhaps conclude that there is too little material for anything but tentative conclusions to be drawn from them.

If it is difficult to establish local stylistic groups in Magdalenian art, the

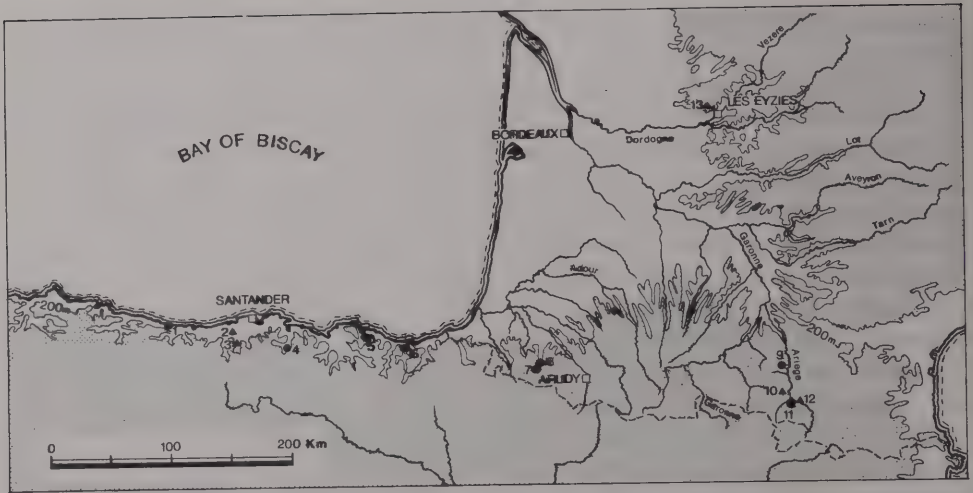


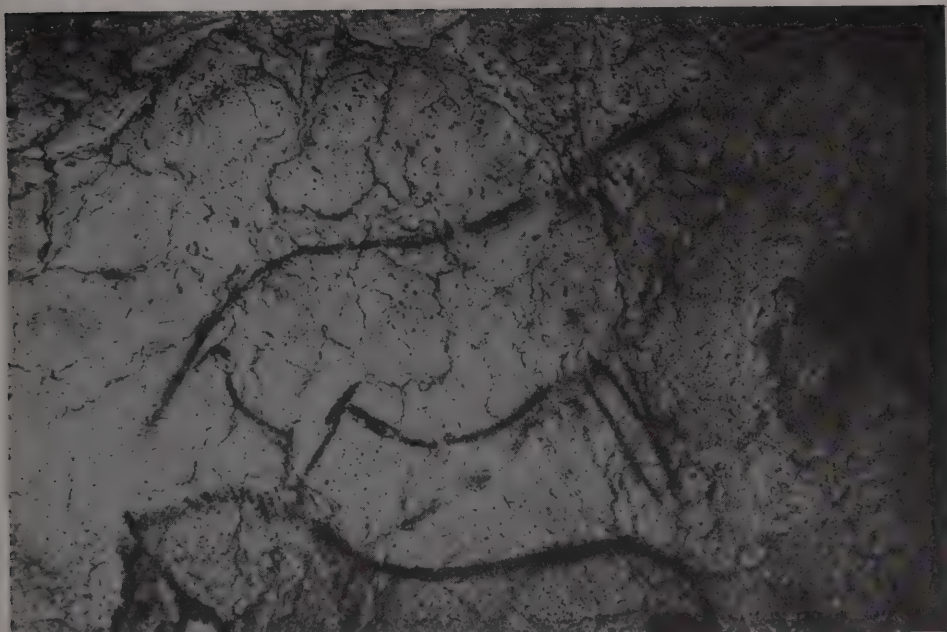
Fig. 1 Map showing the distribution of sites belonging to, or closely associated with, the 'black outline' group in the Pyrenees and Spanish Cantabria. 1, El Pindal; 2, El Castillo; 3, La Pasiega; 4, La Cullalvera; 5, Santimamiñe; 6, Ekain; 7, Sinhiokole-Ko-Karbia; 8, Etchiberri-Ko-Karbia; 9, Le Portel; 10, Bedeilhac; 11, Niaux; 12, Fontanet; 13, Rouffignac.

alternative hypothesis, that there is a very wide distribution of certain stylistic formulae, is much more feasible to demonstrate. As a last example of the strength of similarities between different regions one may take the 'black outline' group of paintings found in the Pyrenees and Cantabria. My description of these as 'black outline', is not altogether satisfactory for in most of the caves, for some animals, a change of colour is made to red. However the majority of figures are black and the term 'black outline' avoids any implication of date or place of origin. In the Pyrenees, Niaux and Le Portel in Ariège typify this group and, characteristically, their paintings are predominantly of bison and horse in black outline. These outlines may be unfilled or have some interior shading. If shading is used it is employed according to very strict conventions. In the horses, at its simplest, a cheek line and a single, double or even triple line on the shoulder is added (Plate II). In the more detailed figures shading of short parallel lines is used to indicate the animal's thick coat; the wavy line along its flank is shown and the coat above is shaded in. For bison, the simplest addition to the basic outline is usually a single or double line emphasising its mane; when further shading is used, although it is still employed to give relief to the figure, it is distributed quite differently from the manner used on horses. On bison shading is used on the hind legs and in a diagonal pattern from the tail to the top of the front leg, with the shading on the lower part of the animal, not the upper (Plate III). In some cases a heavy outline is used to create the same effect.

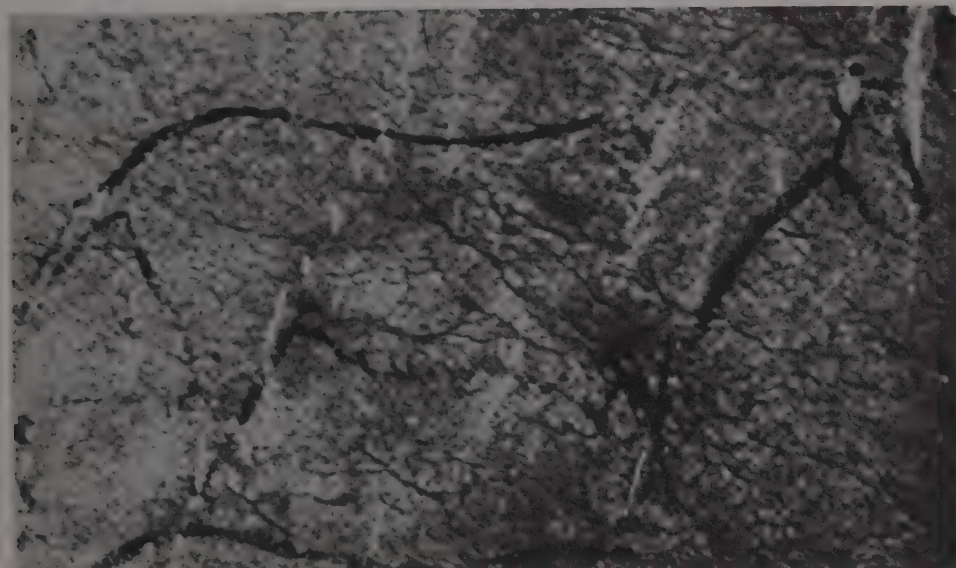
This black outline group is the most consistent and recognisable of all



## STYLE AND REGIONAL GROUPING IN MAGDALENIAN CAVE ART



*Plate I* Horse from Ekaïne, Guipuzcoa, in black outline. It has a single line on the shoulder and the proportions of the figure are those typically found in the 'black outline' group. Length of figure 85 cms.

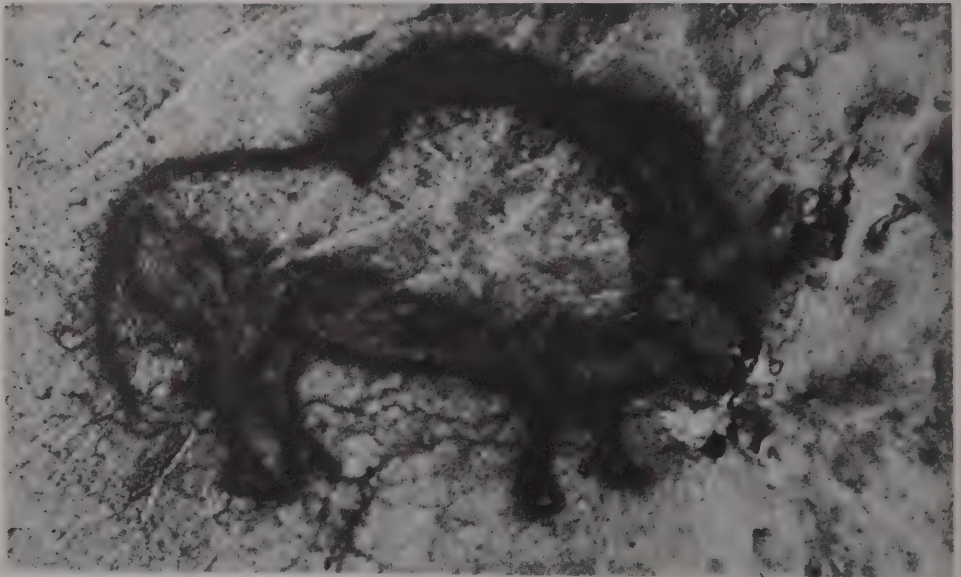


*Plate II* A comparable black outline horse from La Cullalvera, Santander. Here the cheek, as well as the shoulder line, is shown. 50 cms in length.





*Plate III* Bison in black paint from Niaux. Ariège, showing schematic diagonal shading of the coat. Length of figure 100 cms.



*Plate IV* Bison from Santimamiñe, Vizcaya, also painted in black and showing similar schematic shading to the Niaux figure. Length approx 40 cms.

Palaeolithic mural associations. As in Niaux, bison and horse are the basic theme. To these may be added a few additional species, usually deer or ibex, but they may be omitted altogether. Many caves of this pattern have an unusual animal: there is a stone marten in the Réseau René Clastres at Niaux, for example, a tunny fish at Pindal, bears at Ekaïn, and fish are more than usually common. Amongst the animals there is usually at least one drawn vertically and one without a head and in the category of human representations one or more 'phantom' figures or faces. As for the signs, they are limited in variety: there are dots and claviforms.

The style of drawing in these 'formula' caves is very consistent and quite recognisably the same from cave to cave; the figures are static and are drawn standing in profile. The outline is often complete, in contrast to many Palaeolithic figures, and is drawn with a strong continuous line, or with a few long strokes for back and legs. Neat vertical, parallel lines are used for mane and beard or to indicate any hair that springs or falls from the body line and the shading follows stereotyped patterns, whether done in line strokes or flat wash. The hatched shading, typical of Niaux, is translated at Etchiberri and Ekaïn into a flat wash but the area coloured is the same, with a clearly marked dipping line on the flanks. The outlines of bison and horse conform to a particular proportional balance: the bison are short-bodied and short-necked, (for example Pindal and Niaux), while the horses have rounded haunches and a low placed tail, (for example, Etchiberri, Cullalvera, Santimamiñe, etc.) (Plates I and II). In total, the characteristics of this 'black outline' group constitute a very recognisable formula but caves that conform to it seldom exhibit all the basic traits; they show a varying proportion of these. For example one cave, such as Santimamiñe, (Vizcaya), may have many vertical animals, instead of the statutory single example and another no claviforms or headless animals. Even at this most conventional period no cave is an exact replica of another.

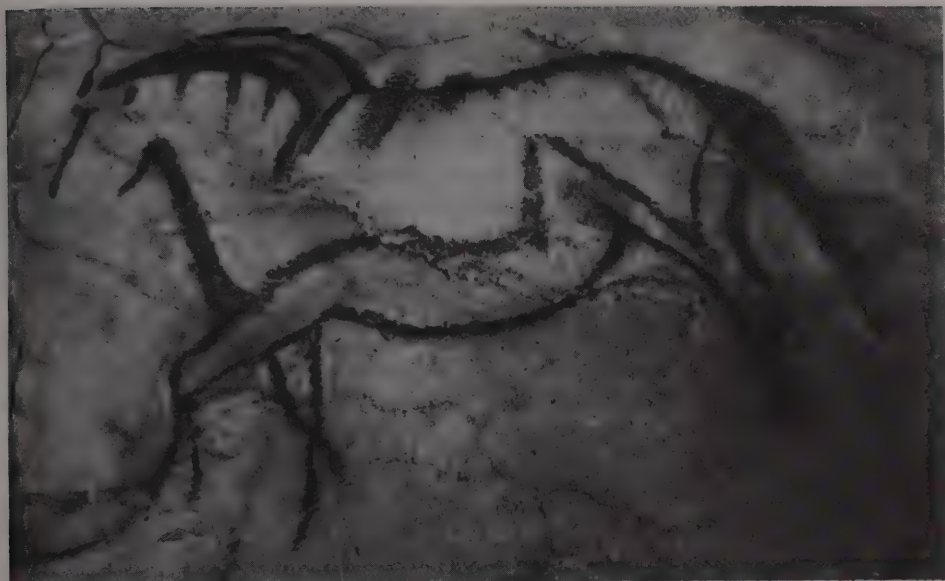
In the Pyrenees, Niaux and Le Portel (as stated above) are the most striking examples of this unified group. Sinhikole-ko-Karbia and Etchiberri-ko-Karbia on the French side of the frontier in the Pays Basque belong to it and so does Ekaïn on the Spanish side. It continues along the Cantabrian coast with Santimamiñe in Vizcaya, La Cullalvera in the province of Santander and El Pindal in eastern Asturias, (in Pindal the figures are mostly in red). In Périgord, (although there are other contemporary caves), the only possible aspirant to this group is Rouffignac which has some of the few claviforms found in this region and where the paintings are in black outline. To a certain extent it is arbitrary to complete this group of Pyrenean and Cantabrian sanctuaries with El Pindal, for every element in this formula occurs in other caves. For example in the Pyrenees, Bédheilac or Fontanet have nearly all the basic traits, that is animals in black outline, horse and bison, ghosts, vertical animals, headless animals and claviforms but they have much more besides and this greater variety of decoration is a barrier, (as at Rouffignac), to their being included in the black outline group, for this is defined as much by the absence of certain elements as by the presence of others.

The situation is the same again in Spain. Certain galleries in Pasiega or Castillo are closely related to the black outline group. It is probable that at this stage many caves were refurbished with this formula, or that in some cases where this decoration was initial, other figures and motifs were added later. In either case they do not qualify as one-period caves and the black outline formula is a fashion that is relatively short-lived – that is to say, all these caves are one period, short-term sanctuaries; in many of them the decoration is placed deep inside the cave and they seem to have been little frequented. Their close stylistic affinities suggest they must be contemporary, but with regard to the Cantabrian examples this raises a problem, for the sites in the Pyrenees that belong to the black outline group are dated on archaeological and climatological evidence, (Clottes 1974: 69), to Magdalenian 'IV' and Magdalenian 'IV' is a stage considered to be almost totally absent in Spanish Cantabria. This is a complex problem beyond the scope of this paper but it is relevant to say that even in France the six stages of the Magdalenian are no longer seen as an immutable chronological succession and that to use the French nomenclature in Spain, for industries that often have little in common with the French, is misleading.

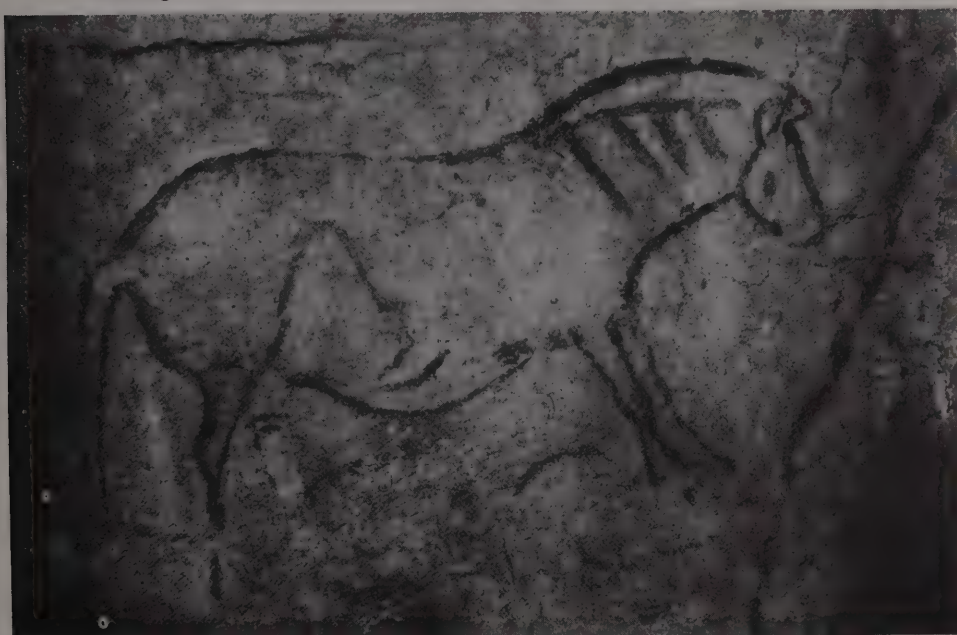
When drawings from different, widely separated caves are very alike there are, perhaps, three possible explanations. The first, (and least acceptable), is that the same artist painted both, the second that whoever painted the second had, at some time, seen the first cave, (or perhaps one like it, now lost) and the third explanation, (Leroi-Gourhan's), is that both were copied from a prototype, perhaps an engraved pebble that could be carried about. Considering the distances involved (Ekaïn is 250 km from Portel and Santimamiñe nearly 350 from Niaux) this last seems the most reasonable solution; however, in consideration of what we know of portable art, it is not at all satisfactory. There is no portable art piece, for example, drawn in the manner of the Niaux and Santimamiñe bison; in portable art the details chosen and the manner of shading this animal are quite different. In the case of horses the differences are not so extreme, a few miniature art pieces, such as the ivory horse from Lourdes, have the double shoulder line and the wavy, ventral coat markings, but none show stylisation so extreme as the Ekaïn and Portel horses (Plates V and VI), where the figures have almost been reduced to a pattern. Stylistically the Niaux and Santimamiñe paintings of bison are very close (Plates III and IV), but they are not identical; the technique used at Santimamiñe is coarser and less assured. The two caves, in fact, are not the work of the same artist and the most likely explanation for their similarity is that Santimamiñe was painted by someone who had seen Niaux. Perhaps having lived with a group in the Pyrenees he subsequently joined a group who hunted and gathered along the coast and hinterland of the Pays Basques and, while there, painted a sanctuary according to his recollection of Niaux.

This picture of very widespread connections between mural art sites is endorsed by the distribution patterns of portable art: these show a very widespread distribution of any single type and a corresponding lack of local concentrations. Small objects may, of course, be distributed by trade, or as gifts; they do not





*Plate V* Horse in black outline from Le Portel, Ariège, showing a very formalised pattern of coat marking and mane. Length of figure 45 cms.



*Plate VI* Horse in black outline and wash from Ekaïn, Guipuzcoa, with coat and mane drawn in a very similar manner to the Le Portel horse. Length approx. 72 cms.



necessarily demand much movement of people but close similarities in mural (fixed) art must demand this. From the overall uniformity of their art as much as from the close similarity of widely separated individual caves we may assume, not only that Magdalenian people were accustomed to travel considerable distances, but also that such travel was probably frequent, rather than sporadic. Occasional outside contacts would not have been sufficient to inhibit local stylistic developments in art and the record we have, whether from cave or habitation sites, shows very little evidence of local or regional styles. The evidence of their art suggests that people in this period, (the late Upper Palaeolithic), in Franco-Cantabria did not live in isolated tribal or family units but belonged to an extended cultural group.

No present day hunting group exists in quite the same conditions that prevailed in the Upper Palaeolithic and ethnographic comparisons need to be made with caution, but it is relevant that all known modern hunters and gatherers who for most of the year live in small groups, congregate together from time to time in larger numbers. This may be for a variety of reasons, such as to conduct ceremonies, or hunt communally and it may occur annually or more or less often. This is an observation that applies to small groups living mostly at a low subsistence level. In recent years the Upper Palaeolithic has been placed at the other end of the scale and described as the original affluent society with an unparalleled material plenty, though only a low standard of living. However, one of the first effects of affluence, it is suggested, is to establish territoriality; if conditions allow, people tend to settle (Dyson-Hudson and Alden Smith, 1978; Yellen, 1977). If one considers the evidence of Palaeolithic art it is clear that some adjustment must be made to the picture of the affluent Palaeolithic society. Although perhaps only periodically, life was either not so affluent, or it was not predictably so, for some factor, presumably economic, demanded that Magdalenian people should travel; their art is a record of movement, not settlement. This movement could have been seasonal, which would allow a relative degree of settlement, but the implication of the art distributions is that social groups were flexible rather than rigid and that travel must have been an essential part of such people's lives. The extent of such travel is still difficult to explain, for the similarities in portable art pieces and in the decoration of caves indicate contacts over much greater distances than the environmental conditions necessitate. Perhaps we must allow a cultural factor as well, but this is to embark on speculation. Magdalenian art indicates an integrated society with uniform beliefs that show surprisingly little regional grouping, but we cannot, at present, say what factors determined this.

### **Abstract**

Although the Magdalenian is the West European Upper Palaeolithic culture that is richest in art, regional groupings are not consequently more apparent in this stage. In Franco-Cantabria, in caves of the period, the artistic variety of the earlier

## STYLE AND REGIONAL GROUPING IN MAGDALENIAN CAVE ART

cultural stages is superseded by a general uniformity in content and layout; such regional differences as exist are confined to stylistic detail. This adherence to a widespread formula is most clearly demonstrated in the 'black outline' group of decorated caves located in the Pyrenees and Spanish Cantabria. They appear as a contemporary, short-lived phenomenon in the late Magdalenian. Not all caves of this date belong to this group but those that do may be distinguished, not only by their strictly defined inventory, but also by their extremely close stylistic similarities.

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# Late Mesolithic societies and the environment of the uplands of England and Wales

by I. G. SIMMONS

## Introduction

In the years since 1945, palaeoecological research has furnished a remarkably full and fascinating picture of the relations between man and environment during British prehistory. Within this framework the received opinion until the last decade was that the alteration of ecosystems, whether deliberate or accidental, started with the advent of the Neolithic period, i.e. with the coming of agriculture (Godwin, 1965). However, recent work, together with the reinterpretation of earlier findings, suggests that pre-agricultural hunting groups of a Mesolithic culture deliberately altered their environment in order to gather resources, and that this may have led to ecological changes which lasted for a variety of times, some apparently permanently. In order to review these postulated modifications, this paper concentrates on a particular set of places, the English and Welsh uplands, and a particular period of time, 8500–5000 bp, the late Mesolithic *sensu* Mellars (1974) or later Mesolithic *sensu* Jacobi (1976).

The British uplands present today a largely tree-less, peat-clad landscape, vegetated by various kinds of moorland dominated above 300 m by ericaceous shrubs, grasses, sedges and mosses (Pearsall, 1968). The land is now used as sheep-walk, grouse moor, watershed, and recreation area, and some of it is afforested with exotic conifers. In spite of their wet and cool climate (Taylor, 1975), these uplands were largely covered in natural woodland (pine forest by 9600 bp and mixed oak by 5500 bp during the mid-post-glacial period (Pennington 1969; Simmons, 1975a), and it is with the beginning of the disappearance of this forest that this paper is largely concerned. Because most of the uplands have extensive deposits of peat (Pearsall, 1968; Tansley, 1968) and have never been cultivated more than sporadically during historical times, they preserve to a considerable extent both the archaeological and the palaeoenvironmental evidence for the reconstruction of prehistory. They have therefore attracted more attention than some lowland areas (though there are notable exceptions like Star Carr and the Somerset Levels) and the findings given for

a particular set of environments must not be taken to extend to other areas for which no comparable evidence is yet available.

### **Main sources of evidence**

As with many such investigations, the basic clue to the human presence comes from the remains of lithic industries. In the case of the late Mesolithic of upland Britain, these are dominated by various types of chert or flint microliths and scrapers. They are mostly <5 cm long and the culture characteristically lacks the large tool industry of the Palaeolithic and earlier Mesolithic (Maglemosian) cultures (Mellars, 1974; Jacobi, 1976; Campbell, 1977). The implements are typically found as concentrations on the moorland areas beneath peat or beneath the humus layer of podzolic soil. At lower altitudes, spreads of them are found ploughed out in enclosed land long subjected to agriculture: their distribution can be mapped but their stratigraphic relationships are often lost. Sporadic finds of Mesolithic tools of various kinds occur also in the lowlands peripheral to most of the uplands and there is some feeling that the coast may have had developed its own special subset of environmental potentialities (Palmer, 1977). In Northern Ireland, the moorlands appear to be bereft of the upland spreads of implements found in England and Wales, and a concentration on lakes, rivers and sea is found (Woodman, 1973-74). Remains of settlement forms are rather scarce for this period but both the pattern of the flint distribution and evidence of hearths, shelter or hut platforms and occasional post-holes have been used by excavators to infer the length and intensity of occupation and hence the likely economy and impact on environmental resources (e.g. Radley, 1968).

Palaeoenvironmental evidence is relatively plentiful: that gained by pollen analysis of both soils and organic deposits is particularly useful and easily acquired, but other remains such as the soils themselves, snails, insects and diatoms are all yielding evidence about the state of the environment at the time, and man's role in it (Evans, 1975, 1978). The spatial distribution of each of these is important especially in the case of flint industries and settlement types: even when the evidence from individual sites is sparse, an overview of it in relation to similar sites may suggest hypotheses.

Taken together, these various sources of evidence, though often less plentiful and diverse than both earlier and later periods of British prehistory, allow some attempts to reconstruct the Mesolithic life-style and its surroundings. From the flints, a hunting economy is inferred, particularly since the microliths are most likely parts of a multiple-point arrowhead set in a wooden shaft (Clark, 1952). Following the evidence presented by Lee and De Vore (1968) on the latitudinal variations of the importance of animal and plant foods in the diet of near-recent hunters, Clarke (1976) has put forward the idea that they represent part of a plant-gathering tool-kit.

Diagnostic evidence is not yet to hand, so this paper will assume that the arrowhead hypothesis is right, while keeping the vegetable element of subsistence very much in mind. While only microliths are found, most workers have assumed that they are examining a 'hunting camp' when a small number of people went for a short period of the yearly round for a single economic purpose; by contrast, where the Microlith : scraper ratio is more nearly equal, then a longer period of settlement with other economic and possibly social activities is postulated. If viewed at a regional spatial scale these settlement remains suggest a way of life in which movement was an integral part. Some writers refer to this as 'nomadic', a descriptive term which has implications of free wandering (if not indeed of camels!) which are not warranted here: an intermittent pattern of seasonal shift is more likely, as suggested by Clark (1972) for the Maglemosian on the basis of a winter occupation at Star Carr. In attempting to characterise settlement sites, Mellars (1976a) has devised a typology for the whole of the Mesolithic in Britain and for both lowlands and uplands; later in the paper, it will be applied to an upland region. His taxonomy embraces:

*Type I.* Sites of size 10–15m<sup>2</sup> with low numbers of artifacts (the 'hunting camps' referred to above). Probably occupied by 5–6 individuals. Examples are found in the South Pennines and Thorpe Common, South Yorks (6623 bc and 4483 bc respectively) in the uplands, but lowland examples (e.g. Oakhanger in Surrey, 4350 bc) are also quoted.

*Type II.* Sites of size 44–210 m<sup>2</sup> with a uniform density of artifacts. Probably occupied by 2–3 nuclear families totalling perhaps 25 people. These are less common in the uplands than the lowlands, but an undated example at Deepcar, Yorks, can be quoted.

*Type III.* Separate concentrations of artifacts over an extensive area are found. These may be of a 'multiple pit-dwelling' type and are not reported from the uplands.

Environmentally, the later Mesolithic occurs within the 'Atlantic' period of post-glacial climate. Rainfall was probably on average 11% above present-day levels, and average temperatures approximately 2°C above those of today. In the uplands, the higher rainfall would have been amplified by years with rainfalls 25% or even 50% above the average, and evaporation hindered by the lapse rate effect of the altitude upon temperatures (Taylor, 1975). Whereas high summer air temperatures in the lowlands in the late Mesolithic might have averaged at 17.5°C, at 500m, the equivalent would have been more like 15.4°C. This oceanicity was of course inherent in the position of Britain but exacerbated by rising sea-levels which finally insulated Britain ca. 7500 bp, i.e. near the beginning of the later Mesolithic. Nevertheless, post-glacial vegetation succession had proceeded so far as to cover most of England and Wales with mixed deciduous forest in which oak and probably lime were



important trees. The climatically determined tree-line on the uplands seems in places to have been upwards of 700m, evidence being provided by tree-remains in peat at such altitudes.

Yet pollen analysis shows that on some uplands (e.g. Southern Pennines, Dartmoor, North York Moors), the tree-line was, during late Mesolithic times, well below the climatically feasible limit; an upper level of forest of 320–290m was more characteristic. In the Southern Pennines, Tallis (1975) has postulated an upward extension of tree-lines after Mesolithic times (during a period of deteriorating climate) noting that the organic deposits of Mesolithic age in the upland contain not tree remains but charcoal. Similar evidence from the North York Moors has been found by Simmons and Cundill (1974), and Innes (pers. comm.).

These discoveries provide a convenient introduction to the publications of numerous workers (in a preliminary scan of the literature, J.B. Innes (pers. comm.) has found 107 instances of 'Mesolithic' clearances in both peat and soil pollen profiles, most of which are from the uplands – many are dated by reference to pollen zones rather than by absolute methods) of different kinds of evidence for modification of the native vegetation during late Mesolithic times. All the types are found in upland areas and some are found in lowlands as well. They comprise a number of types of evidence:

(a) 'Clearance phases' in pollen diagrams. These are analogous to the *landnam* phases found in agricultural phases of prehistory in that woodland appears to have been cleared but later regeneration takes place (e.g. Pennington, 1975; Sims, 1974).

(b) Forest recession in pollen diagrams. The pollen indicators of mature forest recede and are replaced by indicators of open ground (e.g. grasses, bracken fern, Ericaceae) which stay permanently (e.g. Simmons, 1964, 1969). Both this type and type (a) sometimes contain small quantities of pollen of aquatic plants at the appropriate horizons, suggesting the nearby presence of water.

(c) Many pollen diagrams contain very high frequencies of the pollen of hazel (*Corylus avellana*). This shrub flowers prolifically when a forest canopy above it is removed, stump-sprouts after cutting or burning, and will form a scrub. Its nuts are nutritious and often turn up in excavations of Mesolithic sites (Dimbleby, 1967; Smith, 1970).

(d) Organic deposits in basins show one or more 'inwash stripes' of inorganic matter during the Mesolithic. These stripes interrupt otherwise continuous organic materials and are presumed to have come from open ground yielding silt to the runoff, as would happen at times of deforestation. The pollen content of the deposits confirms the recession of forest at the time they were deposited (Simmons *et al*, 1975). All these phenomena occur during later Mesolithic times and in areas with appropriate artifacts, but it should be stressed that they are not necessarily associated directly with layers of, for example, implements. Charcoal is however frequently found in deposits of appropriate age.

## Functional relations between man and environment

A discontinuous but accumulating body of data has been shown, one set relating to man, the other to the environment. To relate them requires not only inference and interpretation but can be aided by a cautious application of a critical imagination supplied by ethnographic parallels from recent and near-recent hunting groups (e.g. Lees and De Vore, 1968; Bicchieri, 1972). Drawing out themes common to many groups of the latter, two general functional conclusions can be drawn:

- (a) that a number of different types of food resource are likely to have been used on a seasonal basis, and
- (b) that the social groupings varied at different times of year although authors differ as to whether the larger groups are more likely to come together at times of resource stress or plenty.

Using these ideas as linking themes, it is possible to begin to build an hypothesis about man-space-environment relations which can be used as a framework for later data. Here it will be convenient to take as an example the region of N.E. Yorkshire where the North Yorks Moors (Fig. 1) are sharply demarcated on two sides by escarpments and on a third by the sea (Spratt and Simmons, 1976). In

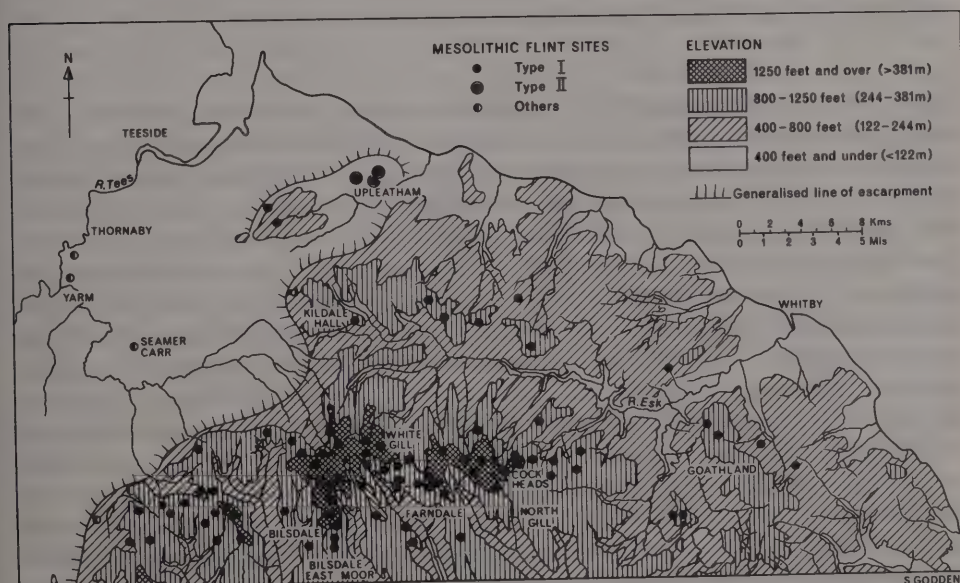


Fig. 1 A location map of Mesolithic flint sites in N.E. Yorkshire, showing a tentative division of them according to Mellars' (1976a) typology. Original data from Spratt and Simmons (1976).

Table 1 Habitats and probable resources of uplands in late Mesolithic of N. E. Yorkshire

Habitat	Major Food Resources	Likely season of use
Mixed oak forest	Red deer ( <i>Cervus elephas</i> ) Roe deer ( <i>Capreolus capreolus</i> ) Aurochs ( <i>Bos primigenius</i> ) Pig ( <i>Sus scrofa</i> ) Wild plants	Especially important in winter: plant food at lowest supply Summer – autumn
Hyper forest	Scrub – hazel ( <i>Corylus avellana</i> ) – birch ( <i>Betula</i> spp.) – rowan ( <i>Sorbus aucuparia</i> ) – bracken fern ( <i>Pteridium aquilinum</i> ) Grassland – <i>Agrostis</i> spp. – <i>Festuca</i> spp. Bog – <i>Sphagnum</i> spp. – <i>Eriophorum</i> spp.	Autumn for nuts  Summer habitat of mammals escaping flies. Pig especially common in mixed communities.
Rivers	Fish, especially salmon runs but also trout, pike ( <i>Esox</i> spp.). Beaver ( <i>Castor fiber</i> )	Spring and autumn at run period
Lakes (periphery of uplands only)	Fish, especially pike. Beaver	All year
Coast	Mollusca, crustacea, birds, fish, seals.	Winter availability likely to be important

Table 1 the probable resources for the later Mesolithic are set out. The evidence for the vegetation types is direct but for the animals is inferential from knowledge of this type of forest today and in the recent past. It is envisaged that most of the region was covered in mixed deciduous forest in which there were some large mammals. However, the carrying capacity for them in virgin high forest was not likely to be particularly high because of the relatively low quantity of browse, which is characteristic of the seral phases of regeneration of the forest, not of its mature stage. A place where the mature forest was broken was at its upper edge, probably at 325–360m, where the continuous tree canopy gave way to scrub, including a lot of hazel (*Corylus avellana*), grassland, and occasional patches of acid mire dominated by *Sphagnum* spp and *Eriophorum* spp. This set of habitats was doubtless attractive to deer on account of the browse from the shrubs, and the quantity of soil invertebrates beneath the mixed vegetation types would have brought in wild pigs, and perhaps there was also a relative freedom from biting insects in summer. The tree cover would ensure largely silt-free rivers with steady regimes (compared to their 'flashy' nature today) which would have been highly suitable for brown trout, for salmon (which ran up all these rivers until the 19th Century, and still do in the Esk), and in larger pools for pike which needs still water pools with dense water-plant growth on which to lay



its eggs. A few lakes peripheral to the upland would have been available for fish, wildfowl and beaver; this last would no doubt have modified some of the stream courses. Beyond all these lay the coast and the estuary of the River Tees. Sea level at that time being slightly higher than at present, the salt habitats of the estuary penetrated further inland than at present. The complex of resources afforded by the sea and estuary must have included fish of many kinds, birds (especially eggs and nestlings), seals, possibly the occasional stranded whale as in Scotland (Clark, 1952) and the detritus feeders of rocky shores such as Molluscs and Crustacea, together with edible plants of the coastal zone.

If the concept of seasonal movement of the exploiting people is accepted, it is interesting to consider when these various biotic resources might best have been utilised (Mellars, 1975). The large mammals would be concentrated at lower elevations in winter and thus perhaps most easily hunted (Noe-Nygaard, 1975). Equally, plant food is scarcest in winter and early spring and so the animals would most likely have played a critical role in survival during this period, helped possibly by stored plant material such as hazel nuts gathered the previous autumn. The zone above the forest (called hyper-forest in Table 1) provides more browse than the high forest and would have been most attractive to animals in summer although the climatic difference between sea level and 350m might well have been less noticeable when most of the terrain was forest-covered, and red deer could cover that altitude quite easily in a single day if their food were available in winter. Nevertheless, the likelihood seems to be that pig and deer were hunted in late spring through to autumn in this zone, with the season possibly ending with the autumn rut of the deer. It is here too that any remaining aurochs (by later Mesolithic times a scarcer beast) would have been most likely found and easily hunted, especially if mires were present.

The importance of the rivers would have lain firstly in a year-round supply of coarse fish and beaver, neither easily obtained in quantity but nonetheless present, and secondly in twice-yearly runs of salmon which were presumably present in very large numbers at those seasons. In spatial terms however these would have been trapped or speared more or less anywhere along the rivers between the upper estuary and the spawning beds, with a possible preference for narrow parts as at Ingleby Barwick. So the only inference about human spatial behaviour that can be made involves a twice-yearly concentration at the rivers. The resources of the coast would have been available all year but would have presented a special attraction in winter when other food supplies were short (if for example deer numbers were for some reason at a low ebb); spring-time taking of birds' eggs and nestlings might also be considered.

In summary, therefore, the region can be held to have presented a year-round set of resources to a hunting, fishing and gathering culture. To further the hypothesis it is now necessary to consider the settlement remains found in N.E. Yorkshire and see how these fit the postulated pattern of available resources. These types and their locations in terms of terrain and habitat are summarised in Table 2, which also gives

Table 2 Settlement types and resource use in N. E. Yorkshire: Hypothetical

Area	Mellars' (1976) type	Habitat	Occupation level	Function(s) and season(s)
High moors 310 m	I (Low diversity of flint types)	Hyper-forest forest edge at Springheads	Small gp, ca 5	Deer hunting, summer. Fishing, autumn and spring
Hills of Periphery of Upland 180 m	II (Higher diversity of flint types)	Forest overlooking coast, estuary	Large gp, ca 25	Winter camp or base camp central to all activities or twice-yearly transitional camp
Riverside and Coastal	I	Forest exc. right at coast	Small gp.	Autumn and spring salmon runs. Winter strand- looping
Lakes	Only scattered flints	Forest to Lake margin	? Transient small groups	Lake perch, food for only temp. occupation: any season might be fruitful: lake rarely iced over

hypothetical occupation numbers (derived from Mellars' typology) and an economic interpretation of the settlement's function.

On the higher ground are found large numbers (Fig. 1) of Type I settlements with low implement diversity, usually associated with spreads of charcoal and found at an interface between mineral soil and peat, a stratigraphy which precludes accurate dating and palaeobotanical analysis since the flints could have laid on the soil for some time before being covered with peat (Simmons and Cundill, 1970). Many of these sites are at or near spring heads (cf. the aquatic pollen referred to above). That they were short-stay hunting camps for mammals seems very likely, and summer seems to have been the most likely seasons of occupation. It might be added, though, that they could also have been used as fishing camps at times of salmon run if the fish were caught at headwater spawning places. The abundance of charcoal, if not derived solely from ordinary fires, might allow an interpretation of smoking as a method of preserving either meat or fish.

Still on the hills, but at their edge, is found another type of settlement exemplified in N.E. Yorkshire by a site at Upleatham (Spratt *et al*, 1976). This falls into Mellars' Type II category, with a higher diversity of implements suggesting a variety of economic activities and the area of settlement leading to an interpretation of a bigger group of people, perhaps 25. The Upleatham site is on the northern escarp-

ment of the upland, overlooking the basin of the Tees and the coast and so would be intermediate between the coast and the higher ground inland. It might have been a winter camp based on hunting deer inland in the valleys which transect the upland, with expeditions to the coast which is now only 2.8 km away, although likely to have been 3–5 km further at that time. Alternatively, this site might represent a twice-yearly gathering of people on their way from the hills to the coast, where Type I (narrow economic base) sites are found. Since Upleatham is about 2 km from a stream of any size, it is unlikely it was occupied by all the group at the times of salmon runs. (A series of Mesolithic sites is found on the Durham coast, none on that of Yorkshire where it is presumed they have been eroded away).

Although more evidence is clearly needed, this information permits the construction of a tentative model of settlement and economy for a yearly cycle, and this is presented as Fig. 2. Part (A) of the diagram suggests which environment within the region was occupied at different times of year, and Part (B) the economic activities pursued. Because of the spatial character of the rivers, which transect other zones, activities associated with them (i.e. fishing and beaver-hunting) could have been combined with most of the others unless these were very special places for fishing. The implications of this diagram revolve round such questions as, how many of these activities could have been carried out on short trips from a base camp and how many would have required the movement of a whole group. Certainly some of the overlaps in Part (B) suggest that there was some division of labour at times, which would have been achieved by differentiating the tasks of men and women or by the splitting of the larger (c. 25 people) group into smaller units who might then come together again for food exchange.

The fragmentary evidence, suffused with some insight gained from ethnological parallels, offers a provisional picture of a population often on the move, and presumably tangential to, rather than great manipulators of the energy and matter flows of their ecosystems. Yet as suggested above there is palaeoecological evidence for environmental manipulation: is there a paradox here?

### **The nature and location of environmental alterations in late Mesolithic times**

None of the evidence, quite naturally, shows any direct evidence for interference with animal populations; while culling of them must have affected numbers there is no way at present of telling whether the overall magnitude and composition of mammal populations would have been affected on anything other than a short-term basis. Pollen analysis does however provide evidence for forest recession during late Mesolithic times in places where lithic remains are found and so these are usually attributed to human activity and called clearances. In lowland England they appear to be commonest on siliceous substrates, often at places which are now heathland



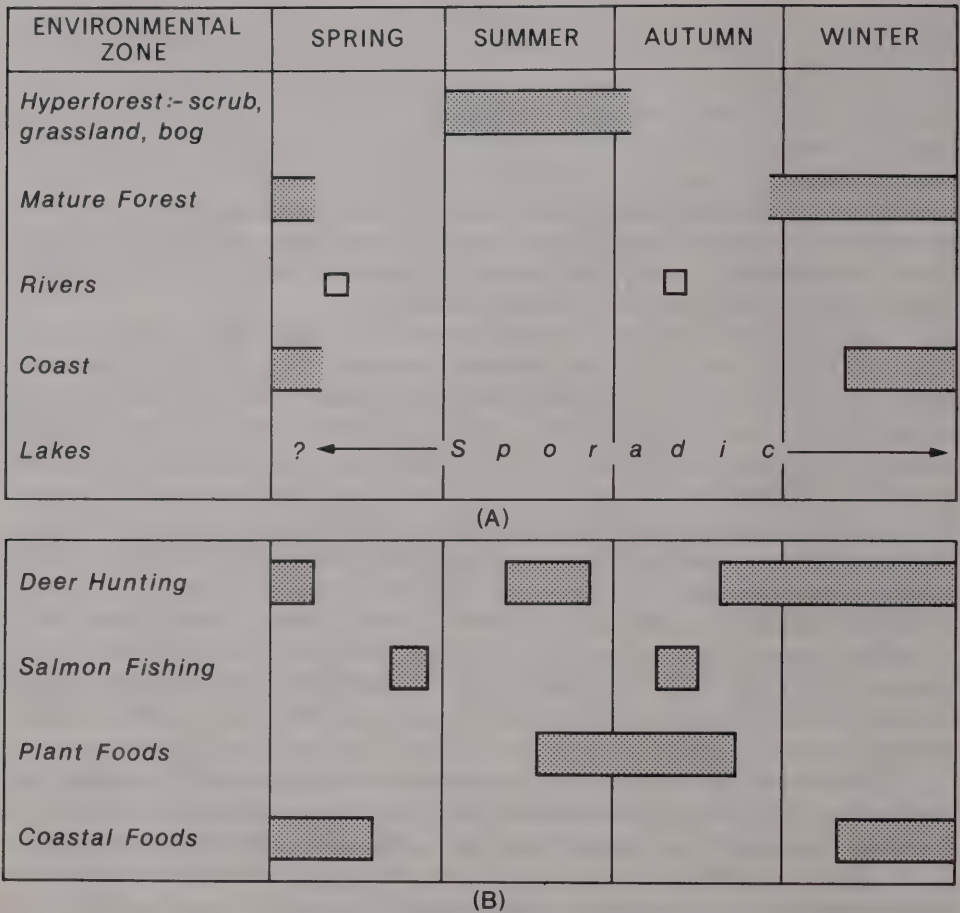


Fig. 2 A tentative scheme for the seasonal use of environmental resources by late Mesolithic communities in N. E. Yorkshire. The upper part of the diagram plots season against ecosystem; the lower part shows season against food resources.

such as the Weald of S.E. England, and the Breckland in E. Anglia (e.g. Dimbleby, 1960). Within the uplands, the inorganic inwash stripes referred to above are found in a limited number of places and although not confined to the Mesolithic (indeed they are most frequent in later prehistory) they are found within that period. The quantity of silt suggests that sufficient tree cover had been removed to allow the runoff to transport soil material downhill into accumulating rivers and to form spreads of inorganic material over and among the vegetation. The same process can be observed today in some of the channel mires of N.E. Yorkshire (Atherden, 1972).

In the uplands there is more evidence for forest recession in areas where Mesolithic remains are found and where the recession phases on the pollen diagrams have  $^{14}\text{C}$  dates of appropriate age. Sometimes the pattern is like a typical Neolithic *landnam* phase without the agriculture, and the succession is forest-grassland-forest, with interpolation suggesting a short (30–60 yr) interval of open ground between forest episodes (e.g. Tinsley, 1975). In some other places, the sequence is different. Here, the forest limit is either pushed downhill or never attains its climatic potential and acid grassland or shallow peat forms. After the end of the Mesolithic period, deciduous forest colonizes the shallow peats and grasslands. In this case, the opening is held for hundreds of years. The presence of charcoal in the organic deposits draws attention to the probable role of human communities (Tallis, 1975). A third type of sequence is found on the highest parts of uplands where the angle of slope is low. Forest clearance is followed by acid grassland, then heath vegetation dominated by heather, (*Calluna vulgaris*), and then blanket peat (2–3m is common). This process is not reversible in the manner of the other two instances; once the forest has gone it does not return (Moore, 1975). The role of bracken (*Pteridium aquilinum*) in inhibiting tree regeneration by allelopathic reactions would be an interesting investigation in this context.

In the light of the patterns of economy and settlement hypothesised above, how might these alterations to the vegetation be explained? The obvious possibility is the deliberate action of Mesolithic groups to improve their subsistence base and in this case to increase the quantity of browse available to mammal herbivores, in particular red deer (Jarman, 1972). The most likely method would be to burn the forest at its upper edge where climate started to exert a thinning effect on the mature forest and to enhance the area of browse-yielding species such as alder (*Alnus glutinosa*), birch (*Betula* spp) rowan (*Sorbus aucuparia*), and, above all, hazel (*Corylus avellana*), at the expense of the trees of the high forest. The effects of burning would be to increase the quantity of browse within reach of the deer a year or two after the burn, to increase its quality since the foliage would probably be higher in protein a year or two after the burning (Dills, 1970), and to produce a mosaic of vegetation types (forest, scrub, grassland) which might be attractive to other animals as well, notably any remaining aurochs and the wild pig (Mellars, 1976b). The sites at which a burning programme would be carried out would doubtless have included the areas near springheads: these would have been the highest places near the forest edge where animals would come to drink. This probably explains the concentration of Type I sites near to spring-heads. Setting fire to the vegetation of a maritime upland would require a thorough knowledge of the environment, for it would only be at particularly dry periods (late spring and later summer are often propitious) that the ground and shrub vegetation would burn satisfactorily: crown fires in deciduous forest are difficult to imagine. In their work on the Southern Pennines, Jacobi, Tallis and Mellars (1976) suggest that tracts of forest might have been re-burnt at intervals from 5–15 years possibly on a rotational basis, and that the individual areas fired

would optimally have been relatively small, so as to provide adequate cover for the animals and the hunters. Where hazel bushes were encouraged, the whole process could have the additional benefit of increasing the autumn crop of nuts.

The effects of such burning schedules are observable in pollen and stratigraphic analyses. In some places, they are only temporary, and the forest gradually returns: presumably, the people or the animals moved away or ceased to exploit that particular area. At other sites, however, the sequence of acid grassland – heath – blanket peat is found. This appears to have resulted from a clearing which was held open long enough for irreversible changes in the water and nutrient relations of the vegetation to have taken place. At these high altitudes and on areas of low slope, the role of the trees in transpiring water and circulating nutrients is critical so that if deforestation occurs, the soils easily become waterlogged without the root system of the trees, nutrients are translocated down the soil profile, or are lost in runoff, and the solum becomes more base-deficient, bearing only acid tolerant grasses and *Calluna vulgaris* which itself produces a highly acid leachate. Thus in wet acid conditions, peat-forming plants such as the moss *Sphagnum* and the sedge *Eriophorum* dominate the vegetation, building up considerable depths of peat upon the interfluvies where the slope is low. So starting from small wet hollows, the blanket of peat has on most uplands spread out to cover many square kilometres and forms a part of the contemporary landscape which serves as a reminder of the far past. Not all today's blanket bog dates from Mesolithic times, since some was initiated in later prehistoric times, but the process was the same and a similar end result was produced (e.g. Moore, 1972; Merryfield and Moore, 1974; Pilcher, 1973).

### **The purpose of environmental manipulation**

If the Mesolithic folk were living at a low density and were at least intermittently motile, then was environmental manipulation necessary? The diversity of food sources was high and the only period of difficulty likely to have been the winter and early spring: groups without access to the sea and lacking long-term food storage ability might have experienced resource stress in the early months of the year. A crude site catchment analysis (Simmons, 1975a,b) suggests that if red deer were the main source of food then certainly for groups of 5 people there was no need to move: sufficient calories might be obtained within 3 km of a settlement with a cull of no more than 1/6 of the annual productivity of the deer. With groups of 25 people in the same catchment, one method of calculation suggests that a 1/6 cull would provide 75 days' subsistence, another way that the same cull would feed the group for over two years. Such data do not encourage firm statements but it looks as if frequent movement may not have been forced on a group, and that environmental manipulation to produce more food was scarcely necessary, unless the accustomed levels of productivity had been obtained by burning from time out of mind. But yet another piece of evidence



for the enhancement of food supplied may be added: the finding from Mesolithic sites in lowland Britain that ivy (*Hedera helix*) was gathered in late autumn and concentrated, probably in heaps, near settlements (Simmons and Dimbleby, 1974). This could be indicative of the attraction of animals in winter, or perhaps might even mark the incipient herding of red deer for food or as ritual animals, or both. Presumably such a practice would entail more movement than hunting, in order not to over-use the forage resource: it might also encourage burning to produce a higher density of browse, that the herd might be kept together.

In the context of these data, some speculation about possible reasons for environmental manipulation may be made. For example, if in summer the red deer scattered (and roe deer are not herd animals at any time) then they must be attracted by the combination of abundant browse and water. Culturally, this might coincide with Zipf's principle of least effort: it is easier on the limbs and lungs to attract the beasts than to run after them. (In the ethnological literature, trapping turns up as frequently as chasing with bow or spear, if not more so). There is also the possibility that the practice increases the availability of a preferred food, i.e. in the exercise of a cultural choice which might be summarised as more venison steaks and fewer limpet stews. It is usually assumed that such resource management was directed towards red deer and they are without doubt the most obvious candidates but it is not entirely impossible that the targets were the remaining individuals of *Bos primigenius*. More evidence about settlement type (and it is presumably unlikely that more osteological evidence will ever accrue from the uplands) would help in making models about territory and their probable relation to subsistence availability, as postulated for a part of Southern Germany by Jochim (1976). It is also conceivable that the manipulative effort was a relic of a time when animal food was scarcer and the burning provided the density of animals necessary for human survival. Lastly should be considered the possibility of circumstances in which several millenia of occupation even at a very low density and rate of population growth had filled up the terrain to the point where no 'free' land existed for any people who could not be supported on a particular territory. Then (a) seasonal movement and (b) burning would then be seen as adaptations (a) to increase food supplies by tapping as wide a set of food resources as possible; and (b)) as a form of intensification of land use in which the logical hypothetical sequence would be free hunting; manipulative hunting; herding and, eventually, agriculture (Cohen, 1976). Territoriality would have been an important concomitant of such a set of processes (Dyson-Hudson and Smith, 1978).

### Conclusion

This work presents two final facets of interest. One is that the environmental manipulation discussed here produced the earliest *Kulturlandschaft* of which there are traces beyond the immediate vicinity of a settlement site, as far as Britain is

concerned. In the places where blanket bog was initiated, the effect is still present today. Such landscapes are part of the contemporary scene even though their floral constituents may have altered with time. The second is the early importance of fire as a management tool, representing early cultures' access to an energy source with which to deflect nature's patterns; a feature of pre-industrial cultures in many parts of the world, and used by the succeeding Neolithic culture in Britain as an integral part of their shifting agriculture. But in the Mesolithic period, it seems most likely that it was the key tool in the hands of Man in the Art of Deer Cycle Maintenance.

### Acknowledgements

This paper is based on the 1976 Lister Lecture to Section H of the British Association for the Advancement of Science, and I am grateful to Professor G.W. Dimbleby for providing that opportunity for a discursive and speculative lecture. The present manuscript has been read by a number of people, among whom Dr D. A. Spratt has been most helpful.

### APPENDIX: AN ETHNOGRAPHIC PARALLEL

It is not easy to find good ethnographic parallels for the Mesolithic period of the U.K. Ideally, what is wanted is a group living in a deciduous forest as hunter-gatherers until observed and recorded in the late 19th century. Failing that, we have to look at the records of groups which never fulfil all of these requirements at once. The seasonal movements of the Eskimo, for example, are interesting but the environment is scarcely comparable to the mid-Flandrian; the North-east Woodlands Indians of the north-east U.S.A. at contact time used fire as a hunting aid but also had agriculture and lived in a mixed coniferous-deciduous forest setting. Around the world, some Tasmanian and New Zealand groups exhibit interesting similarities but mostly are coastal-oriented and thus not so suitable for the Mesolithic occupants of our uplands.

Because it has been little referred to by other authors as an ethnographic parallel, I draw attention here to the Ainu of Hokkaido, Japan. Until Hokkaido was thoroughly assimilated into modern Japan after 1868, the Ainu had a pre-agricultural life style, with deer and salmon as the key elements of their subsistence, farming being introduced in 1883. Because of the lateness of their 'colonisation', their aboriginal ways are well described by travellers and contemporary anthropologists have also sought information from the older generation of Ainu, few pure-blooded members of whom are left. The *doyen* of Ainu anthropology is Professor H. Watanabe of the University of Tokyo Institute of Archaeology, and his publications

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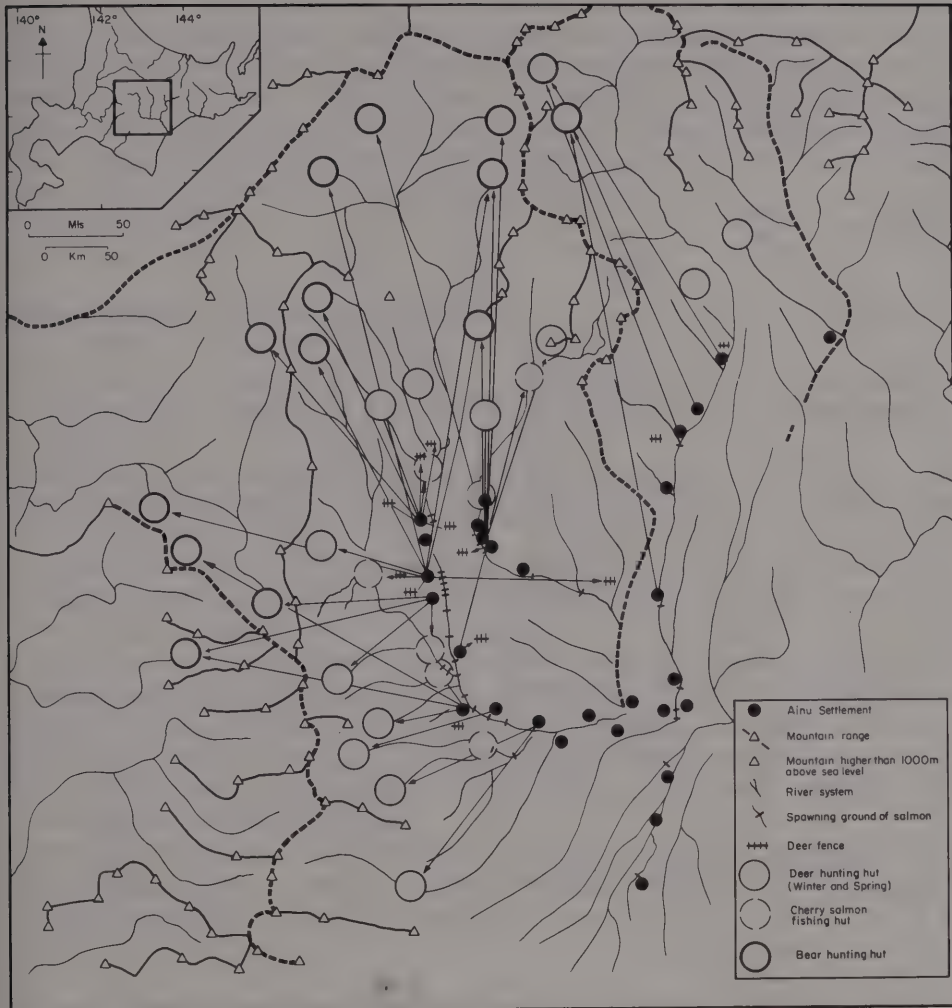


Fig. 3 The seasonal-spatial relations of a group of Ainu in a major valley in Hokkaido. The straight lines show the movements of subgroups from the main settlement out to seasonally available resources. The heavily pecked line is the water parting between the mapped valley and the adjacent ones.  
Source: Watanabe (1972)

(see list at the end of this Appendix) give a full account of the Ainu, as well as using them as part of an ethnographic parallel for the pre-agricultural Jomon period in Japan south of Hokkaido.

The main point of using this work is that not only are the resources of the Ainu known, both in their material phases and the ritual practice of hunting bears and



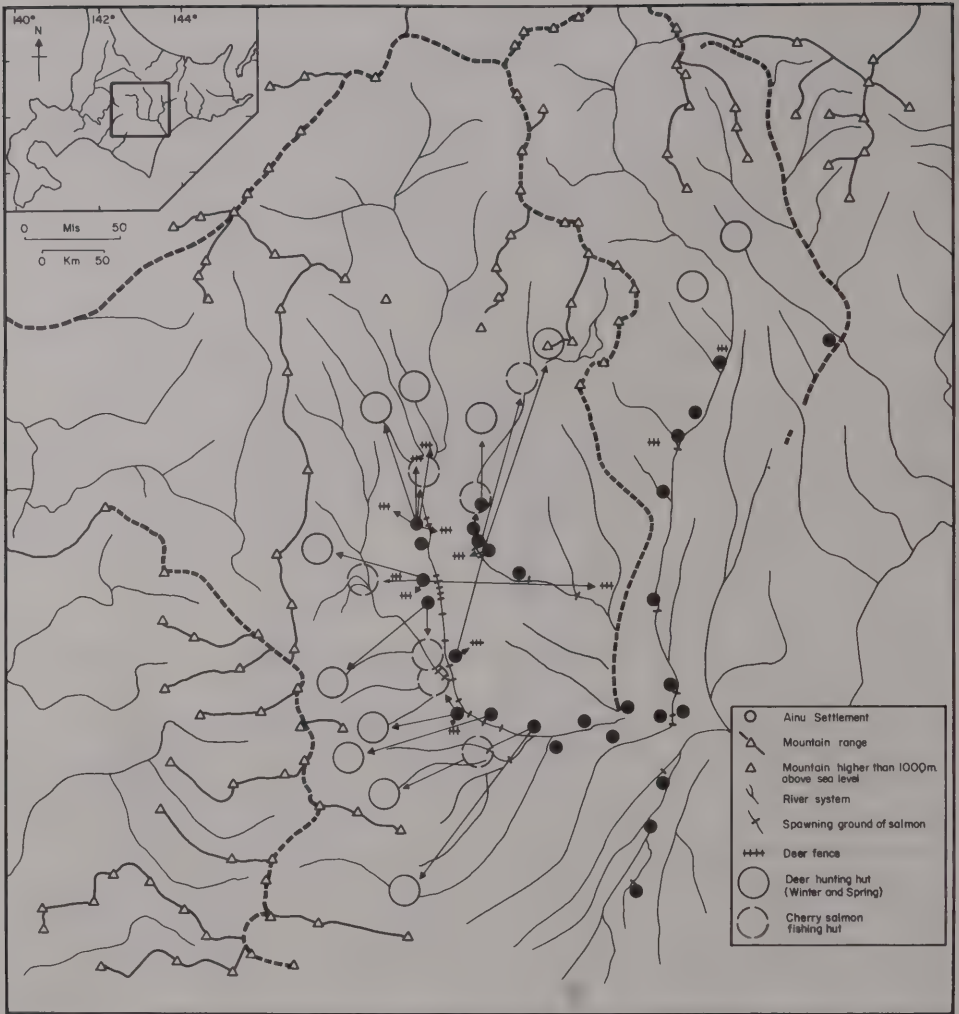


Fig. 4 The same data as in Fig. 3 but with the data on bear hunting omitted. This simplifies the pattern to one in which dependence on deer and salmon forms the economy of the Ainu and can be seen in their spatial relations. The legend gives an outline of the seasons at which the animals were taken; more seasonal details are available in the original publication.  
 Source: Watanabe (1972)

bear cubs, but the spatial relations of the various seasonal activities are also described, and are summarised in Figs. 3 & 4. One point of interest here is that although seasonal camps were used, a permanent settlement was kept within the yearly territory: seasonal movement clearly does not preclude a more permanent

base provided the carrying capacity of the environment is high enough. Unfortunately for my purposes, the Ainu did not manipulate the forest in any way, although they did lure deer by cutting fresh leaves and small twigs and placing them on the ground with spring bows set around them. However, it is the considerable wealth of detail concerning the spatial relations of subsistence within the yearly territory which makes this group of interest to the British prehistorian.

### Major relevant publications of H. Watanabe

1. *The Ainu Ecosystem Environment and Group Structure*. Seattle and London: University of Washington Press, 1972, pp. 170. [A detailed monograph in English].
2. Subsistence and ecology of Northern food gatherers with special reference to the Ainu. *Man the Hunter* (Eds. R. B. Lee and I. De Vore). Chicago: Aldine Press, 1968, pp. 69–77.
3. The Ainu. *Hunters and Gatherers Today* (Ed. M. G. Bicchieri). New York: Holt, Rhinehart and Winston, 1972, pp. 448–84. [Two summary accounts in symposia or edited collections].
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6. Ecology of the Ainu and problems in prehistory in Japan. *J. Anthropol Soc. Nippon*, 72, 1964, 9–23. [In Japanese; English summary. An “ethnological parallel study for Japanese prehistory”].

### Abstract

The main sources of evidence for man-environment relationships in the uplands during late Mesolithic times are reviewed: these are principally the results of pollen analysis of numerous deposits of the period and the lithic artifacts which have been classified into a settlement typology by Mellars. Coalescence of these two bodies of evidence allows the construction of simple provisional models of seasonality of resource use and of social grouping, and these are explained for the North York Moors. It is postulated that deliberate burning of forest and forest-edge vegetation was undertaken in order to increase the quantity of browse for ungulate mammals,

especially near spring-heads. One consequence of the forest recession was a change in the water relations of soils which allowed the formation of blanket peat. Evidence for or against a hypothesis of increasing intensity of land use proceeding from free hunting through manipulative hunting, herding and agriculture, might be the next step in research.

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# The Cusichaca archaeological project (Peru): the early stages

by ANN KENDALL

## Introduction

The Cusichaca Archaeological Project initiated its work in the Cusichaca valley during the 1977 field season and, in 1978, an agreement was signed with the Instituto Nacional de Cultura for a full 5-year programme. The investigations, including excavation and environmental work on 3000 years of occupation, were conceived with the intention of using the results of the late period studies to promote the agricultural rehabilitation of the area.

Cusichaca is situated in the Peruvian Andes at the confluence of the Cusichaca and Urubamba river valleys, 2300 m above sea level and 87 km northwest of Cuzco (Fig. 1 and Fig. 2). During ten years of preliminary investigations at Cusichaca the author was able to show that the Inca architectural remains, consisting of a town (Patallacta), a 'fort' (Huillca Raccay), several associated sites and a complex of land-use and irrigation systems, was one of the earliest schemes of Imperial economic development, c. AD 1440, and a prelude to the building of Machu Picchu. Although at this stage it is premature to come to any conclusions concerning the excavation results which are emerging, it seems timely to discuss the context in which the project is taking place and aspects of the progress being made, first in the archaeological investigation of the Inca period, and second in the programme for rehabilitation (Plates I and II).

When in 1962 John V. Murra tackled the problem of combining post-conquest archival material with field investigation – including archaeological excavation – he initiated the concept of interdisciplinary programmes for Andean studies. Over the last decade archaeologists have collaborated in the many approaches that have been made to Inca research – where interest has centred on such aspects as astronomy, the calendar, architecture, irrigation studies and settlement patterns. Although the Incas are comparatively recent historically, and ethnohistorical records are an essential source of data for their investigation, there should also be studies made which focus with increased concentration on their cultural remains – that is, directly on the



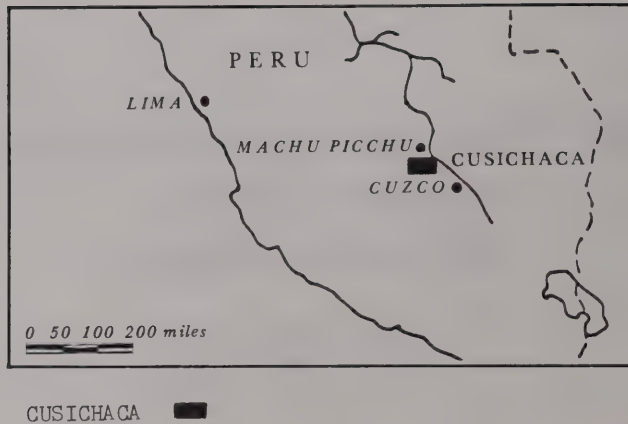


Fig. 1 The location of the Cusichaca valley in Peru, 30 km from Machu Picchu and 87 km from Cuzco.

architecture and the excavation of the occupation deposits. Some work has already been carried out in this direction: a notable example is Craig Morris' work at Huanuco Viejo (Morris, 1974). The problems encountered require an assessment of more detailed excavation techniques backed up by environmental investigations.

The Cusichaca Project is now engaged in multidisciplinary research with particular emphasis on co-ordinating environmental studies with excavations. This is the first time that an integrated study of this kind, with archaeology playing a central role, has been undertaken on the Inca period. The environmental specialists in the fields of botany, archaeobotany, geology, soils' and land-use and irrigation are contributing a fuller picture of the culture and economy, and are an essential ingredient in assessing the feasibility of the rehabilitation of an ancient agricultural system.

### **Preliminary work**

The first study to be made at Cusichaca was of the standing architectural remains (Fig. 3; Plate II). Two detailed studies of the architectural forms, completed in 1970 and 1974 (Kendall, 1974a and 1976c) lent weight to the view that 'classic' Inca architecture and the Empire period began with the reign of Pachacuti Inca, c. 1440. Before any assessment of the function of the buildings could be made, however, it was essential to identify those features which were determined by social requirements/topography, and those which were the result of either chronological or stylistic differences.

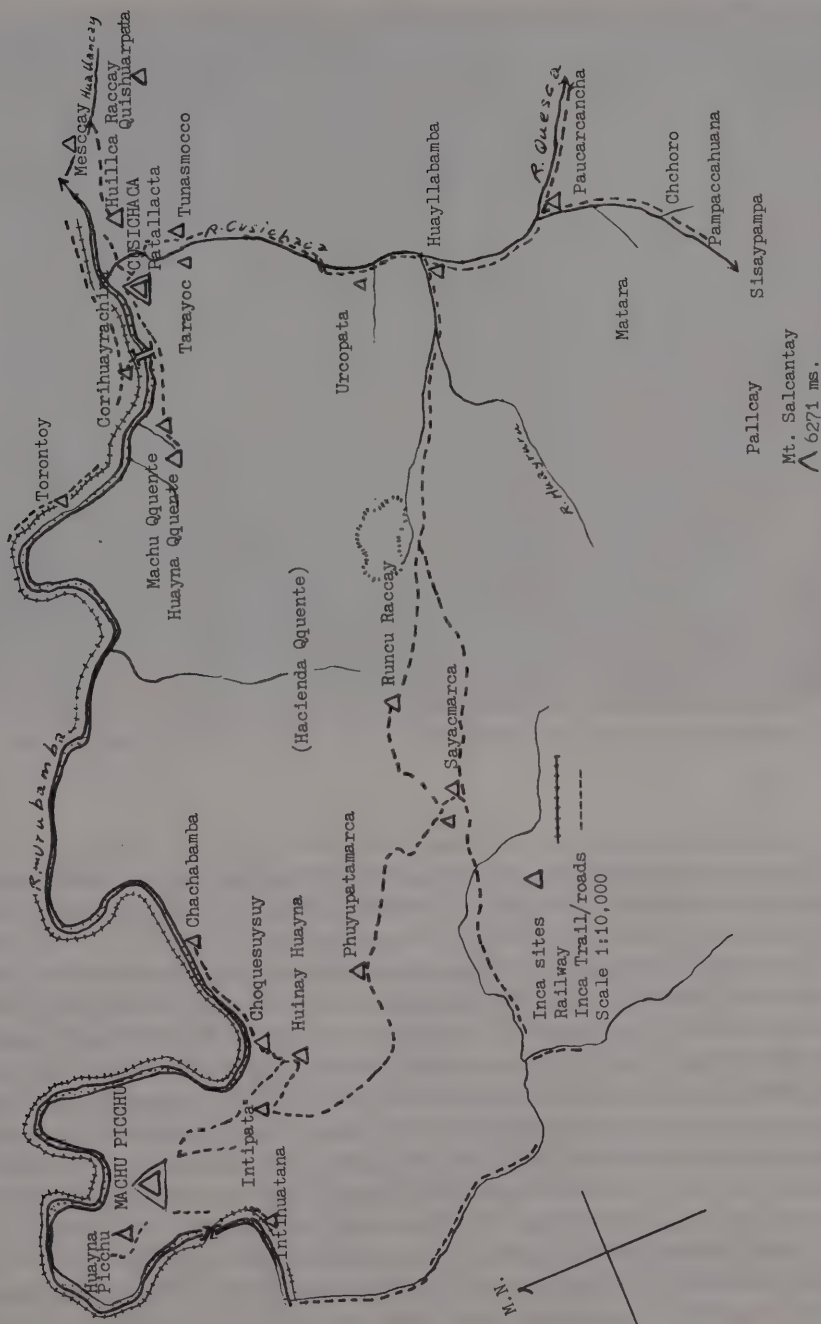
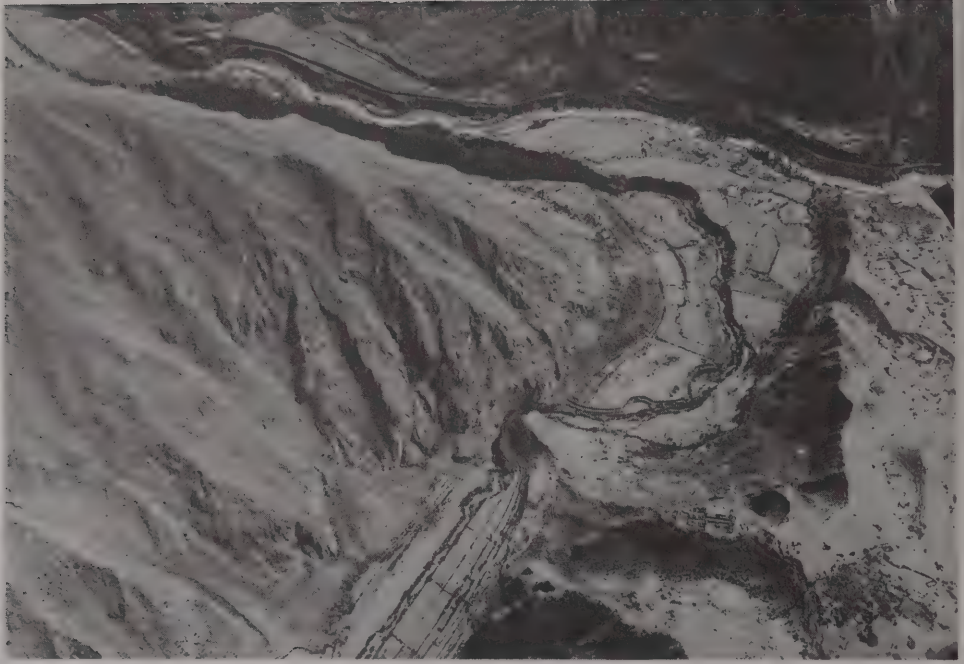


Fig. 2 The Cusichaca valley marks the eastern boundary of the Archaeological Park of Machu Picchu. Accurate co-ordinates are not yet available for Cusichaca but are in process of being worked out. Co-ordinates approximately Lat 72°25' Long 13° 10'.



*Plate I* The confluence of the Cusichaca and Huallancay rivers with the Urubamba (from the air). The canalised Cusichaca river passes between the sites of Huillca Raccay and Patallacta (left). The land to be rehabilitated comprises the tableland between the two rivers (right).

The consistency found in standard measurements of buildings provided a homogeneous architectural model, which could then be compared to other areas. Subsequently a chronology and a hypothesis on the phases of building activities during the 90 years of the Inca period was formulated.

Of particular interest was the regularity and simplicity of the repetitive plans of buildings at Cusichaca, which set them apart from the more complex and elastic planning and detailing found at Machu Picchu, which was evidently built later, probably by Topa Inca, Pachacuti's son. The general lack of economic rationale behind the location of Machu Picchu (but the presence of storehouses) lends support to the hypothesis that Cusichaca was a supplier of food to the more famous site, and was a pre-requisite to its establishment. However, it is evident from its architectural style that the small ceremonial site of Huayna Qquente, on the periphery of the Cusichaca system, was built during a later reign, and possibly after Machu Picchu.

The next step in studying the remains, and developing a strategy for excavation, was to tackle the interpretation of the function of Inca buildings. Because this is a complex subject to attempt without a logical method of evaluation as a means of





*Plate II* Before clearing: the fort of Huillca Raccay in the foreground, with Patallacta, river Cusichaca in the background.

synthesising field and ethnohistorical data, a method was introduced to systematise the various sources of architectural data and to bring these to bear on problems of function (Kendall, 1972; 1974b; 1978). In 1974 this method was presented in a fully detailed format from which interpretations could be formulated. The method was applied, in a case study, to the sites of the Cusichaca area, in which the forms and elements of the architecture were projected onto the social requirements and functions predicted from the ethnohistorical records. The architectural remains were then viewed in conjunction with criteria arrived at by the method. It was thus possible to make an assessment of the function of buildings, complexes, open spaces, and even of certain types of fields and landmarks. It remained to test hypotheses arrived at by this method against data produced by full-scale excavations.

Consequently, in 1973, preliminary test excavations were undertaken at the nearby residential town of Patallacta and the occupation fort of Huillca Raccay. Few of the buildings at Patallacta were considered free of disturbance. At Huillca Raccay, open areas could be seen to have been cultivated since its abandonment, but the

small enclosed structures appeared to be more promising. At both sides it was evident that in the process of construction, either trenches were sometimes dug which were filled in on the completion of the foundation walls, or outer walls of structures were built up and fill was used to extend the levelled site area. Sherds of pre-Inca occupations at both sites were found mixed into the Inca occupation and surface levels since they formed part of the mud mortar and stucco with which the stone walls were built and plastered. It was clear that full-scale excavations would be required before any satisfactory evaluation could be made of the relatively shallow occupation of 30–50 cm. Similar conditions were found in test excavations made on some late pre-Inca sites (e.g. Olleriyoc Trancapata), but a well-stratified, formative Chanapata type occupation was identified beneath the later occupations of the fort.

The combination of different types of pottery in use contemporaneously was evident at both Inca sites. Some Cuzco Inca pots had been mended for re-use and sherds analysed showed clear distinctions between Cuzco and regional Inca, and some pre-Inca pottery pastes and temper.

Conclusions drawn from the initial architectural studies, including plans, test excavations and reconnaissance work (extending the local network within a ten mile radius), were that the area offered good conditions for an intensive study of Inca and late pre-Inca occupations and agricultural development.

### **Preliminary report on the 1977 and 1978 field seasons**

A three-month field session, from June to September 1977, was designed for environmental, and further reconnaissance and background work for the full-scale archaeological investigation which was to take place between 1978 and 1982.

Investigations by the eight participants were concentrated on extending knowledge of the catchment area in two ways; by Environmental Studies, including geological, botanical, land-use and irrigation studies; and, by reconnaissance walks up to, and beyond, the mountain passes bordering the area. At the same time preparations were undertaken for the large scale excavations envisaged. An investigation into the distribution of local pottery types was followed by assessment of the suitability of methods of cataloguing and analysis; the Inca fort of Huilca Raccay was cleared and some emergency consolidation work carried out, and an assessment made of the state of preservation of the structures; the major Cusichaca canal was consolidated; and finally, a logistical assessment for the accommodation of 30 participants in future field seasons was undertaken.

The geological survey of the area was carried out by Dr Christopher Jones, who also contributed to investigating aspects relating to the archaeology of the area. For instance, he was able to show, through analysis of the stone materials used in structures at a number of Inca and non-Inca sites (and on the ground), that only readily available materials were used in construction, and that the varying propor-

# THE CUSICHACA ARCHAEOLOGICAL PROJECT (PERU)

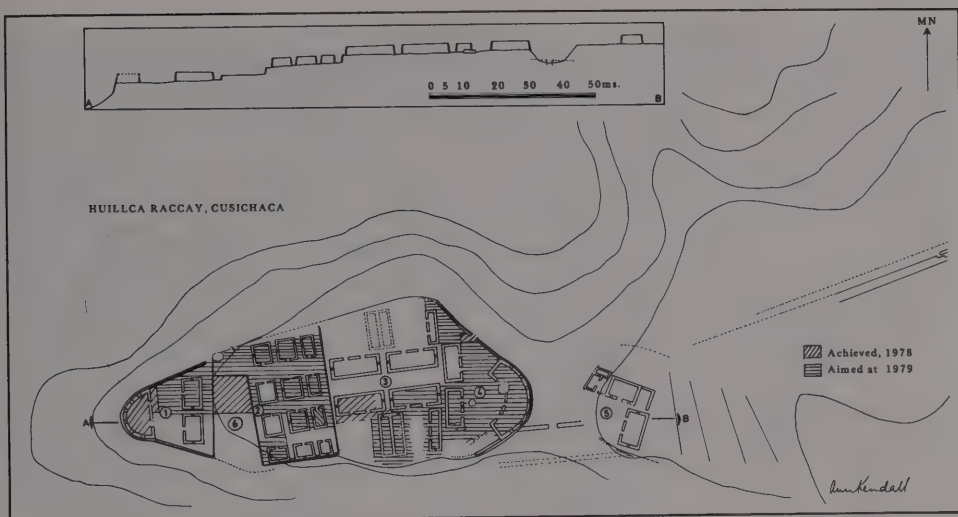


Fig. 3 Excavations carried out in 1978 and projected for 1979.

tions of different types of rocks in adjacent land-forms were reflected in the structure walls. The only stones foreign to the site were those used to make rounded 'rockers' for domestic purposes and these had obviously been brought by the river as pebbles.

A collection of rocks, marked and catalogued with notes, was made for the use of the project in reference and laboratory work in future years.

The botanical/archaeobotanical investigation undertaken by Monica Barnes began with a background study of the modern vegetation of the project area. A collection was started of the plants in flower or fruit. About 150 plants were photographed, described and then pressed; and wherever possible their Quechua names were obtained from the local people. A preliminary report has been prepared on the wild plant ecology of the area, including a vegetational map of the lower region where the archaeological remains of the Inca period are concentrated. This work was continued in the 1978 season when economic plants of the area and adjacent areas were given priority.

Barnes also started a collection of seed, wood and other plant parts which were likely to be preserved in archaeological contexts. These were carbonized under controlled laboratory conditions for comparison with other archaeological materials which would be forthcoming from the excavations.

Ian Farrington carried out the land-use and irrigation survey. The canals and terraces associated with the major archaeological sites were examined and reconnaissance walks were made to follow other canals to their sources. Work was then concentrated on two canals, the Cusichaca and the Quishuarpata, which were level-



led to determine discharge levels. Small excavations and cleaning were also carried out to determine methods of construction and discharge levels.

The Cusichaca canal, which was built in the Inca period, was in urgent need of restoration to keep it in use. Four problem areas were chosen for restoration of the canal channel (to counteract infiltration) and the supporting terrace wall (to counteract undercutting by the river) (Plate III). When successfully rebuilt in three sections (and attention had been paid to the fourth), water flowed to fields and terraces which had not been irrigated for some years, thus ensuring the domestic water supply and the irrigation of terraces under cultivation. Traditional stone construction techniques and materials were found to be essential for successful rebuilding, although a little cement and plastic sheeting was included in relaying the channel bed, which was finally relined with slates in the Inca manner.

High altitude 'puna' canals/drainage channels were noted and will be studied in the future. Spring derived canals at Tunasmocco and river straightening in the same area were also looked at with a view to future work. The work was continued in the 1978 field season.

A series of reconnaissance walks were undertaken from Cusichaca to the upper reaches of the valley drainage, Mount Salcantay and the passes of Jacas, Huayunay, Matara and Pallcay, bordering the catchment area. In the centre of these both Inca and non-Inca sites were documented where either architectural remains or surface pottery were visible.

The emerging settlement pattern within the valley, confirmed by further reconnaissance in 1978, shows drastic changes of emphasis over the last 1000 years. The late pre-Inca sites, featuring circular structures and 'Killke-related' pottery (Kendall, 1976), are concentrated at around 2,900 m on lower ridges, or in the mid valley section at the uppermost maize/major potato growing line. The Inca occupation is concentrated in the lower valley region where they could ensure their major terrace systems and irrigation schemes by securing the upper reaches and controlling the communication lines, including those of the Urubamba valley. The later pattern has reverted somewhat to the pre-Inca one but with even greater emphasis on withdrawal to potato/herding zones, so that at present the greatly reduced overall population of about 100 families is concentrated in the mid and upper zones.

In order to further investigate possible communication systems with the adjacent areas an exploratory walk was made from Cusichaca, Province of Urubamba, to Huarcocondo, Province of Anta, in the direction of Cuzco. The walk carried out by the author and Fidel Ramos confirmed the existence of a well-preserved Inca road, starting from the mid Cusichaca valley at Paucarcancha, which served as a link in the Cuzco to Machu Picchu route over the mountains. Two Inca tambos (rest-places) of similar ground plans, in different ecological and topographical conditions, were documented. Several lookouts, small road stations, and sections of canalized rivers were also noted.

The numerous late pre-Inca remains discovered and identified in the





*Plate III* Consolidation of the Cusichaca canal in 1977.

Urubamba drainage between 1968 and 1975 (Kendall, 1976), have characteristics not yet found in the Cuzco Basin, but which had been reported from the west. Since the Cusichaca valley provides a direct route via the pass of Mount Salcantay to the Apurimac drainage it was expected that further sites might be identified along the mountain routes connecting the valleys of the two drainages. A brief reconnaissance was therefore carried out by the author and Ramos on the further side of the mountain of Salcantay, in the catchment area of the Colorado and Apurimac rivers. The river valleys of Lecheria (Sondor) and Rio Blanco, as well as the regions of Mollepata, Marcahuasi and Hacienda Estrella, were chosen as the most likely to meet the requirements of successful occupation, comparable to (and in contact with), those of the late periods of the Pampacahuana-Cusichaca drainage and the Urubamba.

Pottery from a Pampa Lecheria site provided confirmation of communication between this valley, of the Colorado-Apurimac drainage, and that of the Cusichaca drainage in the Late Intermediate period (late pre-Inca AD 1100–1400). No further conclusive evidence for close contact for this period was found in the other river valleys, although it is likely that structures of circular form, found at a number of sites associated with a different variety of locally produced, probably undecorated pot-

tery, are of a parallel tradition. The overall picture obtained was that the Inca settlement of the area follows a similar pattern to that of the Cusichaca valley, with population concentrations in the lower, maize growing regions, overlooked by smaller sites (located in prominent and strategic positions) higher in the valleys and at the heads of those adjacent to Salcantay and the Apurimac. Evidence of Middle Horizon, Huari occupation – particularly in strategic sites – was also noted.

The reconnaissance work (Kendall, 1977), which was amplified in 1978, has confirmed both the economic importance of the Cusichaca valley area as a maize producing region and the importance of its location in prehistoric (incl. Inca) times. Cusichaca was a link in the communications systems between the major Urubamba and Apurimac drainages. It was also in a mid position between the highland basins in the Cuzco region and the jungle via (a) the Urubamba valley and (b) via the mountains directly to Machu Picchu and the Vilcabamba province. (Machu Picchu can also be reached via the Urubamba valley.)

Whereas the Urubamba valley route must have been predominantly a civil and trading/exchange route, the mountain route was most probably administrative in function, although it provided direct access to the herding and hunting regions of the area. These latter are likely to have been respectively to the south and north of the Cusichaca valley, en route to Machu Picchu and the Vilcabamba province.

In ecological and economic terms the valley is a micro-vertical system within a major extended vertical system – as Ian Farrington's investigation of the local ecological and economic system shows (Farrington, 1977–8).

In an ethnographic survey Farrington conducted a series of 16 interviews with farmers in all parts of the river valley, in which he asked questions on the following: crops grown, timing of sowing/harvesting, irrigation, size of area farmed, soil perception, hazard perception/diseases, infestations, frost, rainfall, etc., agricultural technology, agricultural ritual, types of animals used, location and ownership of pasture; whether their economy is subsistence/money oriented – the type of location of food exchange; the location and frequency of real purchase and/or exchange.

In a preliminary report on this work Farrington suggests that a marked six zone division of the valley should be recognised, three of which are major Andean zones: the pasture zone (Sisaypampa c. 3900 m); the native tuber zone (3700–3250 m); and a maize/wheat/beans/peas zone (2900–2400 m); and a further three sub-zones, which reflect variations in soil, aspect, slope and microclimate.

This type of close observation of present and traditional economic conditions in the valley was complemented by the author in an *ethnographic* study of local house construction and organisation. Details of houses, their interior and exterior activity areas, and the range and position of furniture and possessions were recorded as fully as possible. This work was continued in 1978. In general it can be said that differences in the patterns are connected with the economic success and status of the owners, but do not reflect any basic differences either in ideas of organisation of the household or in the range of essential possessions. The pattern, as in Inca architec-

ture, reflects or springs from the basic concept of the one-roomed house which may be elaborated, divided or added to. Two basic types appear to prevail: the adobe-built tin-roofed 'Spanish' type structure and the more traditional stone-built thatched type. Possessions are in a wide range of materials, for instance containers are of pottery, enamel, plastic, basketry and wood, depending primarily on function rather than economic access. In 1978 three groups of re-occupied Inca structures, in which there were similar patterns of use to the above, were investigated.

An ethnoarchaeological excavation was carried out on a recently abandoned house at Qquente (Cusichaca), by Edward MacDonnell. The excavation was carried out for two reasons: (a) it seemed possible that there could be a long tradition in the internal layout of the Indian houses; (b) to examine the degree of disturbance of the occupation refuse and try out a working method suitable for local conditions and for the detail of recording required on Inca sites. The finds were excavated in 9 contexts and were recorded and plotted according to the layer in which they were found by triangulation. The interpretation of the excavation was then compared with the verbal evidence of the ex-owner, Guaman Vincente, in a carefully prepared interview, in an attempt to examine the limits of purely archaeological inference. It was interesting that certain anomalies occurred in the interview, which in some cases, were better resolved by the archaeological evidence!

Surprisingly, the only clearly distinguishable activity area was the hearth since it seemed the artifacts/belongings had been piled up and many had been removed to the new house. Most of the clay floor had disappeared, except in the less used corners of the structure. It was considered that plant colonisation and the movement of small rodents and insects could disturb the artifacts (MacDonnell, 1978).

### **The 'fort' of Huillca Raccay and its excavation in 1978**

When the Incas conceived of a complete plan to develop the area the first step must have been to organise the large local population in order to carry it out. Huillca Raccay, a promontory site at the edge of the tableland set at 2,700 m (400 m above the confluence of the Cusichaca river with the Urubamba) was evidently chosen as a secure base for this purpose.

The fort, built of stone set in mud mortar and once roofed with thatch, was in a position to control access routes, and from which to observe the town and the vast agricultural scheme. Rectangular structures, with trapezoidal doorways and niches, (the hallmarks of Inca architecture) are arranged in five distinct groups, with the end groups, their tall trapezoidal windows set in curving outer perimeter walls, dominating access and vantage points. (Judging by the amount of standardised Inca pottery found behind the fort, the builders may have first re-occupied a number of circular structures of a pre-Inca settlement.)



The excavation is designed to find out how the fort functioned, i.e. whether to facilitate military/state occupation, or as an integrated community, or as a community under the restraint of Inca overseers.

The architecture of the Inca site shows little evidence of modification for re-occupation – with the exception of blocked doorways and access points (which may have been for the restriction of animals). Even though there is evidence of cultivation in some areas there were good reasons for wishing to start excavations here; the fort is less pock marked by treasure seekers than many other Inca sites, and its extent (150 m by up to 50 m wide), is seen as a more manageable area for an overall strategy than the larger site of the town of Patallacta, which will have to be sampled more restrictively.

In 1977 the area of the site was cleared of vegetation under the supervision of Miguel Cornejo of the Instituto Nacional de Cultura, Cuzco, aided by four local workers. Small holes in some walls were filled in with stones to prevent further deterioration, and a few supports were located in critical places. It was not possible during the season to carry out the necessary consolidation work on walls, which had either parted with the exterior face collapsing, or had buckled, or as in the case of one curving exterior wall, been undermined by erosion of the promontory. It was evident that an emergency consolidation team should work alongside the archaeologists during the excavation seasons if the work could not be carried out in advance.

In 1978, on the signing of the 5-year agreement the Instituto Nacional de Cultura made a commitment to carry out emergency consolidation under the direction of their representative, the project's new co-director, José Gonzales Corrales. Because there were some delays before this work got effectively under way, excavation strategy was revised by the Director and supervisors Pete Brown, Martin Fox and Gill Hey, to ensure the absolute safety of the 40 volunteers and students participating in the excavations.

The revised strategy meant that instead of concentrating on close-knit house groups with standing walls, attention was directed to open areas where there was no risk of structural instability. There were advantages and disadvantages in this revised strategy. The open areas had in the past been ploughed and in some cases, where the front walls of a structure had fallen, ploughing had extended into a building (as in the case of Building 17) (Fig. 3). Set against this serious disadvantage was the hope that the plough had not reached the base of the Inca occupation level, and that unprecedented information might be obtained in open Area 6, of *lean-tos*, and other temporary structures not previously recorded as forms of Inca architecture. A third reason was the need to investigate these areas eventually for assessing the state of preservation and extent of the pre-Inca occupation of the fort area. The excavations were therefore carried out in three areas of the fort: Area 1, Building 1; Area 6; Area 3, Buildings 17 and 20..

Work began with a survey carried out by Martin Fox, and by the end of the season a new, more detailed plan of the entire site was prepared. Cleaning and





*Plate IV* Consolidation work in progress on a building at Huilca Raccay.

'rubble' planning was succeeded by excavation by trowelling across each area, following the levels/contexts. Where there were no clear distinctions of layers, as in major parts of the areas excavated, arbitrary levels of 5 and 10 cm had to be used. A grid of 2 m squares, later subdivided into 1 m squares was used over each area. The most interesting finds, including all metal and stone finds were recorded by a triangulation method but the smaller sherds and bone finds were bagged according to the grid system of squares. Although, it had originally been the Director's intention to measure in all finds, given the conditions encountered (surface ploughing and disturbance), as well as heavy planning demands for recording rubble, it was not practical to carry out the proposal this year.

*Area 1, Building 1:* Building 1 consists of a semi-circular structure with two doorways in the straight front wall, facing east, and an outer perimeter wall in which were still preserved the bases of some windows. The walls of the structure had partially fallen and the stones covering the ground permitted hope that the interior had not been cultivated. Although it was obvious that the exterior had been cultivated the excavation was extended outside the building to compare interior and exterior occupation levels. Frank Meddens supervised the excavation of this area.



*Plate V* Excavation of Areas 1 and 6.

Time-consuming cleaning and clearing work involved mounting the stones from the wall falls in several piles outside the southeastern doorway. At the northern side the bases were cleared of three small windows with double jambs on their exteriors facing Cusichaca and the Urubamba valley. In the mid back of the building, the wall, including its support wall, had collapsed outwards, revealing a section with a thin layer of decomposed coarse-grained granite, marking the base of the Inca occupation and separating this from the stone fill which had been used to extend the level area of the promontory.

As the building was cleared certain changes in the construction of the front wall became apparent. It also became evident as the excavation progressed that the southeastern doorway had a decorative, or 'window', function and could not have been used as a normal doorway, due to its height above the interior level and the lack of any wear on the intrusive rock – over which entry would have been necessary. These modifications in construction reflect changes in the function of this building during the Inca occupation.

The building was excavated in three parts; north; south; and outside the northeastern doorway. Nearly seventy contexts were excavated but there were no clear distinctions between the major contexts across the building, which were sepa-



*Plate VI* Stone Camelid 'Konapa' from the exterior of Building 1 (Scale in cms).

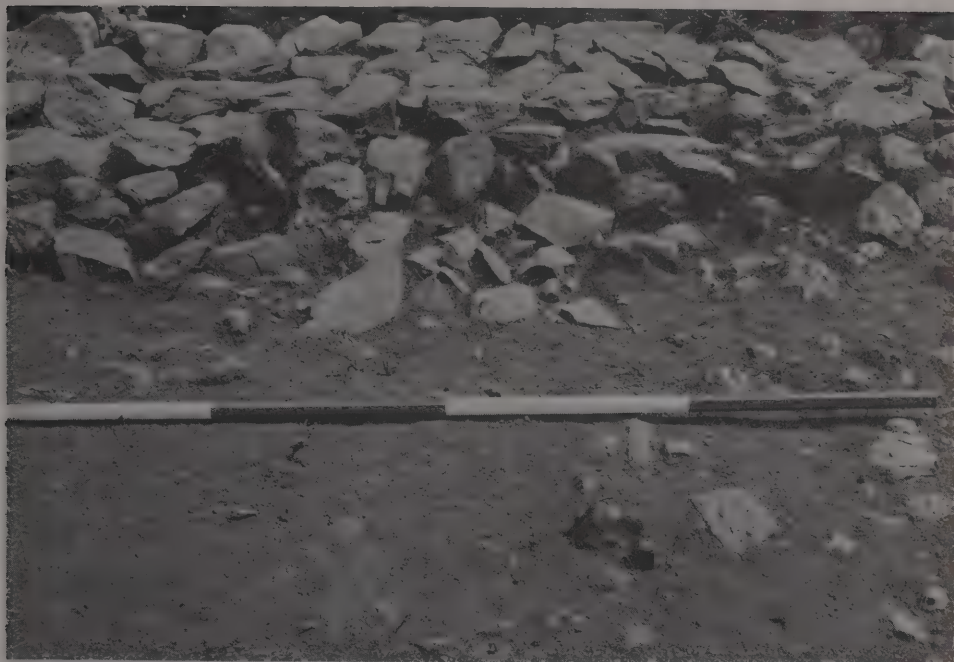
rated mainly into arbitrary levels. A small bench was encountered at 30 cm at the south end against the southern perimeter wall. At the base of the fourth arbitrary level the fill was probably that of construction work. Fragments of interior floor were found at the edges of the structure, particularly against the northern and northeastern walls, in the corner of which there was a dog burial. Beneath the level of this fragmentary floor, the coarse granite showed up in extensive patches and appeared to separate the Inca occupation from the construction rubble and fills, and the pre-Inca occupation. The outside area revealed a pock-marked worn surface area of the promontory which also contained some features.

A 'konapa' – a stone llama vessel (Plate VI) – was found buried here against the outside section of wall. There was a step down of 25 cm into Building 1. As the final interior and exterior contexts were removed, foundations of a circular pre-Inca building were revealed, which passed under the front wall from the outside to the inside of the central section of the Inca building.





*Plate VIIA* Worn terrace wall surface Area 6.



*Plate VIIB* Detail of terrace wall showing worn stones, Area 6.

Because of shortage of time and the necessity for consolidation of the front wall of the rectangular building facing the northeastern doorway of Building 1, the excavation was covered in and will be extended to include the rectangular structure next season.

*Area 6:* The Inca occupation of the northern half of this open area was excavated in eighty-two contexts, under the supervision of Gill Hey and Martin Fox. Although it had previously been cultivated, the area, which consists of a wide terrace between house groups, was absolutely secure from wall falls and offered the opportunity to investigate the activity areas of a large open space. Open spaces and plazas are common features in Inca settlements and their uses must have been varied, but they have rarely been excavated with care. Worn food grinding depressions in some of the large rocks and the presence of surface scatter of rubble nearby, suggested the possibility of either a communal food preparation or a ritual area.

Rubble heaps existed near the walls and the centre of the area around several large immovable stones. These were cleaned, photographed and planned, then the rubble was removed. The top of the revetment/terrace wall, at the west side of the site, was revealed to be very flat and worn for a section of  $1\frac{1}{2}$  m and had obviously been used as a walkway (Plate VII). Elsewhere most of the capping stones had gone.



*Plate VIII* Trench against terrace Area 6.



The top of the wall was on the same level as the plough soil and may have been slightly above the base of the occupation level.

Layers and contexts of plough soil, rubble, and near the walls, patches of sandy clay and clay were excavated. Beneath context 52 a basic layer of brown sandy loam, much finer in texture, was apparently undisturbed. To the north of the site was an area with three patches of hard sandy clay interpreted as worn surfaces. Slightly east, and north, were further worn areas and parts of a floor surface, which were partially overlain by undisturbed layers. Several features filled with dark grey brown sandy loam appeared to have been cut into the sub soil. A possible post hole was observed in the southwest corner of a small trench, dug early-on against the north wall. The trench revealed the edge of the original slope before the upper terrace was built, the wall of which at this point appears to sit on the fill and has no foundation trench (Plate VIII).

The excavation was halted when the Inca occupation had been investigated. Below context 60 the foundations and undisturbed floor of a circular structure was revealed, and another of similar type appeared to be located beside it. The way these two structures are located on the levelled promontory, and the position of the front terrace wall and its walkway has given rise to speculation that the site may have been extended and delimited by a pre-Inca terrace, which was remodelled by the Incas. However, this and other questions will have to wait until 1980 to be resolved when excavations will be renewed to investigate the pre-Inca occupations.

*Area 3, Building 17:* 45 contexts were excavated in this area and building under the supervision of Pete Brown and Judy Enticknapp. Three quarters of Building 17 and a strip of the exterior front space was excavated – including the eastern side access – in order to establish the relationship between the interior and exterior levels. The front wall of this long rectangular building (15.30 m by 6.30 m), which originally had three doorways, had collapsed and the interior of the building showed signs of having been cultivated. The eastern end was not excavated due to the possible instability of the wall. However, test excavations had previously been carried out in this structure and it was decided that it could be useful to have the old sections exposed for guidance (Plate IX).

The upper contexts were disturbed by past cultivation and the action of roots. The three doorways were identified. The last few contexts removed from the eastern end revealed the foundations of a pre-Inca circular structure and a burial.

*Building 20:* Several contexts were removed in cleaning the building of wall falls and clearing the rubble. A 10 cm level was removed in preparation for excavation next year.

*The Eastern access:* Prior to the I.N.C. team of workers clearing the Inca access to the site and to consolidate it a small preliminary excavation was carried out by Edward MacDonnell of a 2 m square area, inside and including the entrance step. 15 cm were removed and the foundation of a wall and a worn patch of ground were exposed. It was decided to extend this excavation in 1979.



Plate IX Excavation of a building in Area 3.

All the excavations were back-filled, the most fragile parts being protected first with pierced polythene plastic.

*Environmental archaeology:* Two types of environmental studies were carried out in conjunction with the site excavations. From a *phosphate survey* it is hoped to gain a better understanding of the use of areas within the site and to answer particular questions in regard to refuse and the keeping of animals. Phosphate work was also carried out in conjunction with a general soil survey of the region (on terraced and other agricultural soils).

Alison Slack undertook the phosphate survey both on, and outside the site. On site sampling covered the three areas dug this season, which were sampled on a 0.5 cm grid every 5 or 10 cm spit, with the exception of those layers which were clearly disturbed. Qualitative field tests for phosphates were used to provide immediate information but did not reveal any distinct features. Field tests to allocate the presence of volcanic allophanes were also used. Allophanes affect the availability of phosphates and contamination was shown to be widespread on a number of levels. The samples are to be analysed by the Eidt method for quantitative analysis of phosphate and the use of such a survey on this site will be evaluated on the basis of the results.

The other environmental site study, the *archaeobotanical* investigation, was intended to be carried out by Monica Barnes. Mainly due to the excavation constraints and the high proportion of disturbance, but also due to the unsatisfactory performance of the wet sieving apparatus this study did not develop successfully. Barnes considered the contexts unsuitable for her work, the amount of organic material inadequate, and the equipment unfit. Since in the general study the evolution of the valley's flora for the late periods may be better investigated through ecological/botanical studies, the lack of success in the recovery of organic remains from the Inca occupation of the site is not critical, although it will be tried again next season in what it is hoped will prove to be a higher proportion of undisturbed contexts and improved equipment.

*The Finds:* The treatment and processing of the finds was supervised by Sara Lunt. Over 6000 potsherds; 1500 pieces of animal bone (10 worked); 40 obsidian flakes; 300 stones (30 worked); 13 metal objects and some shells, and lumps of pigment and daub were catalogued.

Diagnostic pottery was described in detail, drawn and photographed. A preliminary study of some pieces was undertaken by Peruvian students (on the basis of decoration and form) and by Sara Lunt and Jane Pierson-Jones, on the fabrics of some of the Inca pottery – both Cuzco types and provincial types.

Earlier surveys of pottery and Lunt's (1977) pottery studies of collections from pre-Inca excavations (various periods) have already enabled her to single out a fabric type which it is believed was used for pottery produced locally in the Late Intermediate period. This ware may have continued to be produced during the Inca period. The bulk of the pottery from Huilca Raccay this season was from unstratified contexts, mainly disturbed top and sub soil deposits. The preliminary work on the pottery has revealed a variety of types: two-thirds of the total are identified as 'local' on the basis of the work done last year on the pottery from excavations of the pre-Inca site of Olleriyoc Trancapata (the pottery of this site is closely related to the Killke, Late Intermediate period style and culture of the Cuzco area); a small quantity is Cuzco-Inca, on the basis of fabric, form and decoration; and there is a small amount of formative Chanapata pottery, which is distinct in fabric and surface treatment. There remains a large quantity of sherds, mostly small and in a poor condition, which cannot be identified with confidence. A small number of these are decorated and may be attributed stylistically, but in a general way only. Lunt (1978 Int. Report) suggests as a preliminary hypothesis that this variety may not have great chronological significance, but is the result of trade. This hypothesis is supported by the presence of worked obsidian and observation on the distribution of crops and exchange systems within and outside the valley.

The identified fabric groups will now form the basis of an analytical study to be made by the Universities of Southampton, London and Oxford, based on chemical, physical and thin-sectioning techniques. Comparisons of the results will be made with clays collected from the Cusichaca area, providing an indication of which fabrics may have been derived from local clays.



Metal objects are being analysed by Edith Auber and Danilo Pallardel, but it is already clear that lead, copper and alloys of bronze are present in varying amounts. No precious metals have been identified so far. Study of the lithics and of the bone collection will be undertaken next season.

To sum up, perhaps the two most important aspects of this year's excavations were first the unusual range and workmanship of the artifacts found – many of which show signs of having been locally produced, and secondly, that the Inca period overlies an extensive and promising series of undisturbed pre-Inca occupations beginning with the Late Intermediate period *c.* AD 1100–1400. Throughout the excavations Inca pottery was found mixed with pottery of the Killke-related, Late Intermediate style – and at about 30+ cm depth this ware predominated. It is possible that there was a continuation of this pottery through the Inca period, since it is probably locally made. A few potsherds of other pre-Inca types were also found in Area 3, including many of the Chanapata style and a few of the Marcavalle and Paqalla'moqo styles, of the millenium before Christ. Although the pottery of the Early Intermediate period has not yet been recognised, all the other major pre-Inca periods are represented at Huilca Raccay.

The precarious state of many of the walls in the fort and our concern for safety meant that more time and effort than expected was needed for consolidation, rubble clearing and planning. However, this has laid a sound basis for next year's excavation. Because of the shallow occupation, subject to disturbance by roots, vegetation and small animals, a method of intensive excavation is required in order to build up the detail necessary for total recall. Excavations of Inca sites have not usually been successful in finding 'sealed' or well-defined deposits and I think it is worth trying to find a way of counteracting this problem. At the risk of being criticised by British colleagues I believe that it is desirable at Cusichaca to employ the three dimensional recording of all finds – as in a test case, for assessing the degree of disturbance – while at the same time attempting to identify 'activity areas' in those zones which show no evidence of ploughing. Having said this, it is realised that there are obvious logistical problems in the rigorous application of such a method and next season it will first be applied to Building 20 so that its value can be assessed before its application more generally is decided upon.

Finally, studies of the artifacts are to be concentrated first on identifying the raw materials from which they are made and to match these with the resources available locally.

### **Work carried out parallel with the major fields of investigations in 1978**

The following investigations were carried out: archaeological reconnaissance in adjacent valleys; a documentary study in the archives of Cuzco and Lima; and a concentrated effort to locate and obtain adequate information for the preparation of a satisfactory base map of the Cusichaca region.

*Archaeological reconnaissance:* The object of the reconnaissance walks, supervised by Edward MacDonnell and carried out in conjunction with the British army volunteers, was to extend our knowledge of the catchment area and adjacent valleys. Four main walks were made and evidence was collected of a few Inca, pre-Inca and non-Inca sites. However, the most interesting results were the location of mines and past mining activities, and formation of the recent changes in settlement pattern of the adjacent Aobamba valley. The minerals mined were identified as lead, copper and silver.

*Study of archival material:* The aim of a documentary and ethnohistorical inquiry undertaken by the author, is to make a study of the economic resources and population movements in the Cusichaca area for the period AD 1534 until the present. The investigation is being carried out over a period of eighteen months and is intended to complement the interdisciplinary environmental studies for the rehabilitation programme. Data was collected and copied from the archives of Cuzco and Lima, with the assistance of David de Rojas Silva and Luke Holland. Documents were located which contained data on settlement, landownership and population distribution, with evidence of large-scale agricultural activity in the region – and close contact with other towns, particularly Ollantaytambo and Cuzco. Some specific references were found to the project area under the names of ‘Chamana, Mesccay and Qquente’, which were and still are the names of territories in the lower valley area.

The overall picture of the 18th and early 19th centuries, between Ollantaytambo and Machu Picchu, is of large properties – usually owned by religious bodies – providing food and raw materials to the towns, especially to the convents and hospitals of Cuzco. Some major properties were then acquired by big landowners. More recently properties were broken down into smaller units and divided between family members; agrarian reform has diminished these further, while others have been organised into co-operatives.

A series of 22 manuscript accounts of hacienda ‘Silque’ contain remarkably detailed information of the agricultural output of the area between 1751 and 1822. Population census’ for tax, lawsuits, property deeds and even old newspapers contain information on the area. Further information is now being sought on the late 16th and 17th centuries.

*Map:* Although there are small scale maps of the project area there were no satisfactory maps which could be used for investigations. For this reason Dr Christopher Jones prepared a preliminary map of the Cusichaca valley and adjacent areas in 1977, for use in the geological and environmental studies. This year, Michael Barnes, an army surveyor and member of the British army team helping to run the project camp, attempted to obtain from Cuzco adequate information for the preparation of a good base map for the area. With the help of Monica Barnes, government maps (based on aerial photographs), were found and used as the basis for a new detailed map which is now being prepared.

### **Investigations leading to a programme for agricultural rehabilitation**

The emphasis of the environmental studies being undertaken is on the past and present irrigation and land-use systems, and the soils and flora of the area. It is hoped the results of this work will be put to practical use in the rehabilitation of irrigation and land-use systems (canals and terrace systems) which were once part of the extensive Inca scheme and of a late pre-Inca occupation. As such, the rehabilitation project is a model for low cost development – which is unprecedented in this area. Once practical experience is gained of this kind of rehabilitation, the principle could be applied to many similar valleys where ancient canals are still well-preserved, but are now un-used.

In pre-Inca times the area was extensively cultivated, and in the Inca period a vast maize producing development scheme was built and was farmed by a population estimated at 1000 people (maize being the most storable commodity). In 1539 Cusichaca may have formed part of the neo-Inca state of Vilcabamba – but now, only 15 families live in the lower valley and the settlement pattern has drastically changed.

The successful Inca exploitation of the area probably first began to break down under a Colonial government with the withdrawal of the local population to higher, less accessible areas. Today with the Peruvian government's recent Agrarian Reform promoting Co-operatives and an organised farming effort, it is important to provide the sort of technical advice that can ensure a more practical exploitation of local land resources in anticipation of an increase of population in those areas, which like the lower Cusichaca valley, were fully developed under the Incas, but were subsequently virtually abandoned.

It is not intended here to suggest that rehabilitation should be a major aspect of all Andean or Third World archaeological projects. However, some case studies could make a valuable contribution to the concept of this kind of low cost, practical way of solving some rural economic problems in circumstances where this is relevant, without the dramatic interference and change which often results in the disorientation of people subject to new development schemes.

In addition to the work carried out in 1977, in 1978 an investigation of the canal systems and their state of preservation was carried out by Ian Farrington; Mr Donald Green, an irrigation engineer, investigated the canal systems for an assessment of the engineering problems and a programme for their rehabilitation; and Dr Helen Keeley carried out a soil survey of the region, with special attention to the area proposed for rehabilitation. Monica Barnes added to her collection of botanical specimens and made a collection of economic plants and seeds.

Under the supervision of Justo Torres, the Instituto Nacional de Cultura was responsible for the clearing of vegetation along the terraces associated with the stone-lined and terraced Inca canal of Cusichaca. Although, the canal was consolidated in several places last year, the cleaning operation revealed the full extent of the consolidation problems between the intake and Pulpituyoc (i.e. along the first few



hundred metres of the canal). When the farmer at Qquente increased the flow of water in the canal from  $0.5 \text{ m}^3 \text{ sec}$  to  $0.75 \text{ m}^3 \text{ sec}$ , the canal burst its bank at the weakest point. The INC mastermason, who was working on the fort consolidation programme, was called in to rebuild the broken wall. As a result of this Farrington recommended that until the canal can be consolidated its discharge should be limited to  $0.5 \text{ m}^3 \text{ sec}$ .

The Quishuarpata canal, probably a pre-Inca system extended by the Incas, was investigated and its full length assessed for rehabilitation. Donald Green put forward a series of proposals for the consolidation and, where necessary, reconstruction of the terrace and its channel. Taking into consideration the local conditions and logistics of the proposal, he recommended that the problems could be adequately solved by traditional methods of construction and, in critical places, with the inclusion of wooden supports, and parts of metal cylinders for carrying the canal across a few short stretches of moving slopes on steep gradients. By the use of protective trenches and special grasses on steep slopes, most of these problems can be overcome satisfactorily (Green, 1978). Elsewhere, much of the stone structure was sound and only requires cleaning.

The *soil survey*, undertaken by Dr Helen Keeley, examined the soils of the valley. Examination of the terraces in various parts of the valley confirmed the artificial nature of these soils, and showed that the Incas had transported the soils and ensured adequate drainage.

Particular emphasis was placed on the investigation of the soils of the terraces, on and below the tableland of Huillca Raccay, which may be pre-Inca in origin and comprises the area to be rehabilitated. These were found to be up to 1 m deep, with good structure and texture, which should permit the cultivation of a variety of crops if the area can be irrigated. It was also considered that organic fertilizers might be needed. Laboratory work is now being carried out.

In the *archaeobotanical/botanical* collections some progress was made. There is a real need in Peru for a good comparative collection of the parts of plants most likely to be preserved in archaeological contexts, such as wood, seed, pollen and pyroliths. Barnes extended the collection she began in 1977, observing that the flora of Peru is very complex, with an exceptionally high number of wood species. Eduardo Gil Moro, a Peruvian student of botany, joined Barnes to make a study of the transition between Sierran vegetation and the Ceja de Selva, which gives the Cusichaca sites much of their ecological importance.

## Interim assessment

This season's work has been directed towards making progress on the study of the Inca occupation. In this context, although the results of the season's excavations have not been spectacular they are part of what is so far the most carefully carried out

excavation of an Inca site. To test the value of excavating Inca sites in order to build up a fuller picture of local Inca culture it is necessary to employ a painstaking method for amassing detail. It is hoped to be able to record next year, in detail, all the artifacts for reproducing, with overlays, their distribution in the Inca buildings and small protected areas of the site.

Real progress has been made on the economic aspects of environmental work and a soil survey. Since to date no soil scientist has tackled a study of the soils of an Inca terracing scheme the final results of this study will be significant.

Finally, although most of the laboratory work on soils remains to be done, involving an assessment of the amount of fertilizers required, as well as the detailed survey work of the land to be rehabilitated, it appears likely that there will be no serious technical obstacle to the agricultural rehabilitation programme envisaged once the Quishuarpata canal has been the subject of some rebuilding and cleaning.

### **The future programme**

It is expected that with the emergency consolidation work carried out by the INC on the 'fort' and with some areas already planned and prepared, the excavations of the Inca occupation will now progress more rapidly. This concentration on the Inca period at Huillca Raccay will give way in 1980-82 to excavations of other Inca sites and the pre-Inca occupations of the area.

In 1979 work will continue on the environmental studies relating to the rehabilitation programme, now technically shown to be feasible. A detailed topographical survey 1:500 with 1 m contours will be made of the tableland of Huillca Raccay to be rehabilitated. Some cleaning and consolidation work will be initiated with local participation on ancient canals still in use. Subsequently, the experience of this work and the topographical survey will provide the basis for the execution of the pilot plan in the years to follow.

### **Acknowledgements**

The Cusichaca Archaeological Project would like to thank the numerous people who have made the project possible: the participants – supervisors and volunteers; The Institute of Archaeology; London University; Instituto Nacional de Cultura, Peru; Universidad San Antonio Abad, Cuzco; The Leverhulme Trust; The Department of Overseas Development; British Caledonian Airways; Birmingham Museum; The Royal Society; the British and Peruvian Embassies; the British and Peruvian armies; The Royal Geographical Society; UNESCO; Binnie and Partners; and our many other sponsors and friends who will be acknowledged elsewhere.

# THE CUSICHACA ARCHAEOLOGICAL PROJECT (PERU)

## Abstract

Jointly with the Instituto Nacional de Cultura, Peru, archaeological investigations are being carried out by a multi-disciplinary team at Cusichaca, over a period of five years.

The aim of the project is to construct a picture of the history and pre-history of the area and to put the results of these studies to practical use in promoting a programme of agricultural rehabilitation. Progress being made on some aspects of this project is discussed in relation to its nature and context.

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# Wheathampstead revisited

by ISOBEL THOMPSON

In 1936 R. E. M. Wheeler published material he had found as a result of an investigation of the earthworks at Wheathampstead, Hertfordshire, in 1932, since they seemed in some way to be connected to Prae Wood to the south-west by a linear cross-country dyke. The site, at TL 186133, is a high elongated oval plateau on the 300' contour, bounded on the east by a ditch that is partly natural and on the west by a still very impressive bank and ditch known as the Devil's Dyke (Wheeler and Wheeler, 1936: 19–22; Plates V–IX, for the site; and 149–150, Plates XLIX–LIII, pottery and small finds). Wheeler's treatment of the site, with only six pages and ten plates devoted to it, was that of a prologue to his much fuller but still not exhaustive publication of his excavations at Prae Wood and Verulamium.

The published excavation of Wheathampstead comprised a section across the western earthwork and the clearing out of two short lengths of ditch inside the enclosed area at 'Site C' on the plan, Plate V of the 1936 publication. No further excavation within the earthwork has taken place, although there has been a recent rescue excavation to the north, across the River Lea, by staff of the Verulamium Museum. The material found there, as yet unpublished, is clearly related to Prae Wood pottery.

Wheeler published 25 vessels from Wheathampstead, a continental Nauheim bronze brooch, an iron knife with hooked end, triangular clay loomweights, a clay spindle-whorl, and a small bronze strip, bent double, described as a pair of tweezers. The site is interesting and important because the pottery is clearly typologically earlier and more crudely made than the Prae Wood pottery, and because the associated objects support an early date in relative terms. There is no influence from Gallo-Belgic (or other continental) forms; the Nauheim brooch is well known as a first-century BC type on the continent, much used for dating the final La Tène phase; the loomweight has a long life in the Iron Age. The tweezers are described by Wheeler as 'of the elemental type which is familiar on Late Bronze Age, Early Iron Age and Roman sites'. These will be considered in more detail below.

A re-examination of the material was prompted by the discovery of three of the published vessels, together with some unpublished ones, in the basement of the Institute of Archaeology. More unpublished pottery was examined in the stores of the Verulamium Museum, and the published vessels too were reconsidered, particularly with regard to fabric and method of manufacture.



*Plate I.* Westward view of ditch shown on Wheeler's plan at 'C'.

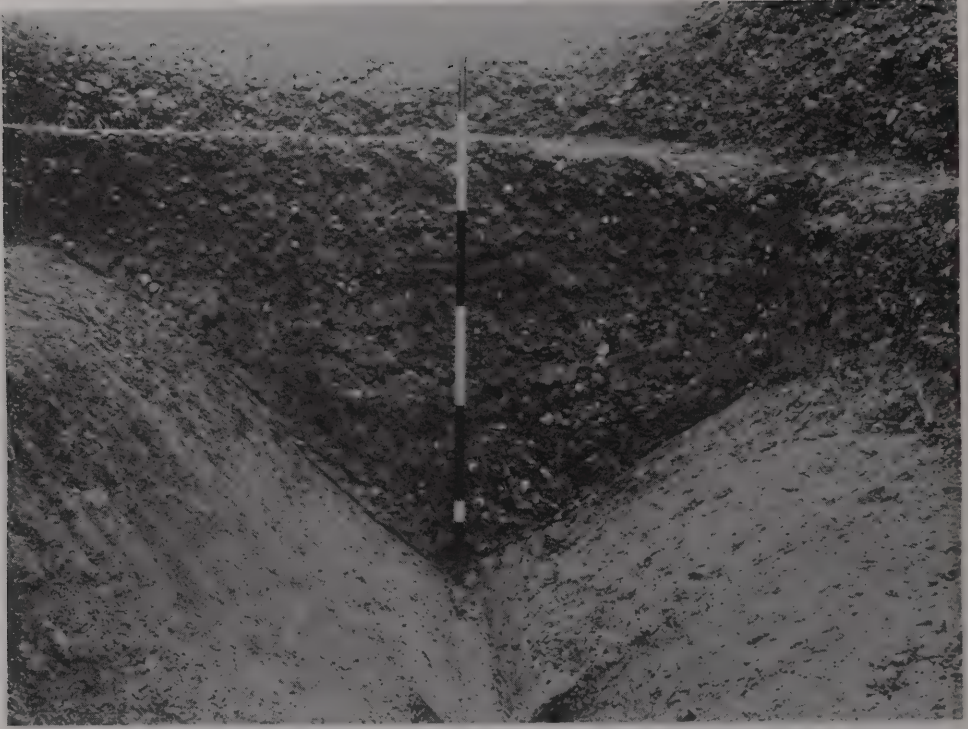




*Plate II.* Close-up of section seen in Plate I.

The unpublished material is presented below: it will be seen that some could be assigned to 'Area A', and some to the 'Sump ditch'. Neither of these descriptions corresponds to the plan, Wheeler's plate V, and there is, unfortunately, no written documentary record of the excavation. The 'Sump ditch' can only, from the plan, refer to the length of ditch marked 'C'; it might be assumed that 'Area A' refers, then, to the Devil's Dyke section. This, though, seems an odd term for a ditch section of this size, and this point is considered further below. Wheeler refers in the text to 'two shallow drainage-ditches' within the enclosure (1936: 19): the second ditch meets the first at right-angles, but the plan indicates that the second was hardly touched by the excavators.

Wheeler's plate VI seems to have been taken from the western end of the 'Sump ditch', looking south-east along its length, and stopping short at the edge of the crop. But what is the large hole in the foreground in which the pickaxe stands? An unpublished photograph on a lantern slide (no. 4184. Plate I) in the Institute of Archaeology shows a view back along the ditch from the opposite end, and beyond to the trees edging the Devil's Dyke. The deeper hole, however, does not appear, and



*Plate III.* V-shaped ditch section; exact location unknown.

the ditch section, about two feet deep as in the published photograph, shows clearly behind the ranging rod. An area has evidently been cleared on each side of the ditch at this point to get a clear view of the section, and a close-up of this box-trench is also extant in the Institute lantern slide collection (no. 4182, Plate II). A third slide (no. 4183, Plate III), shows the section of a V-shaped ditch that is  $3\frac{1}{2}$  feet deep and is clearly not the same ditch at all. Its exact relationship to the first ditch is quite unclear, unless we suppose that the first ditch was further cleared beyond the box trench to the right-angled junction shown in Wheeler's plate V. The deeper hole in the foreground of Wheeler's plate VI remains unexplained, as does its position in relation to the box trench, which may have been nearer the middle of the ditch's length. If the hole were dug at the same spot as the box trench, I think we might assume that the continuation of the first ditch beyond where it showed in section in the west wall of the box trench would have been indicated by a dotted line on the plan, as Wheeler has done for the second ditch. What the precise relationship of the two ditches was at the T-junction shown on the plan remains unknown.

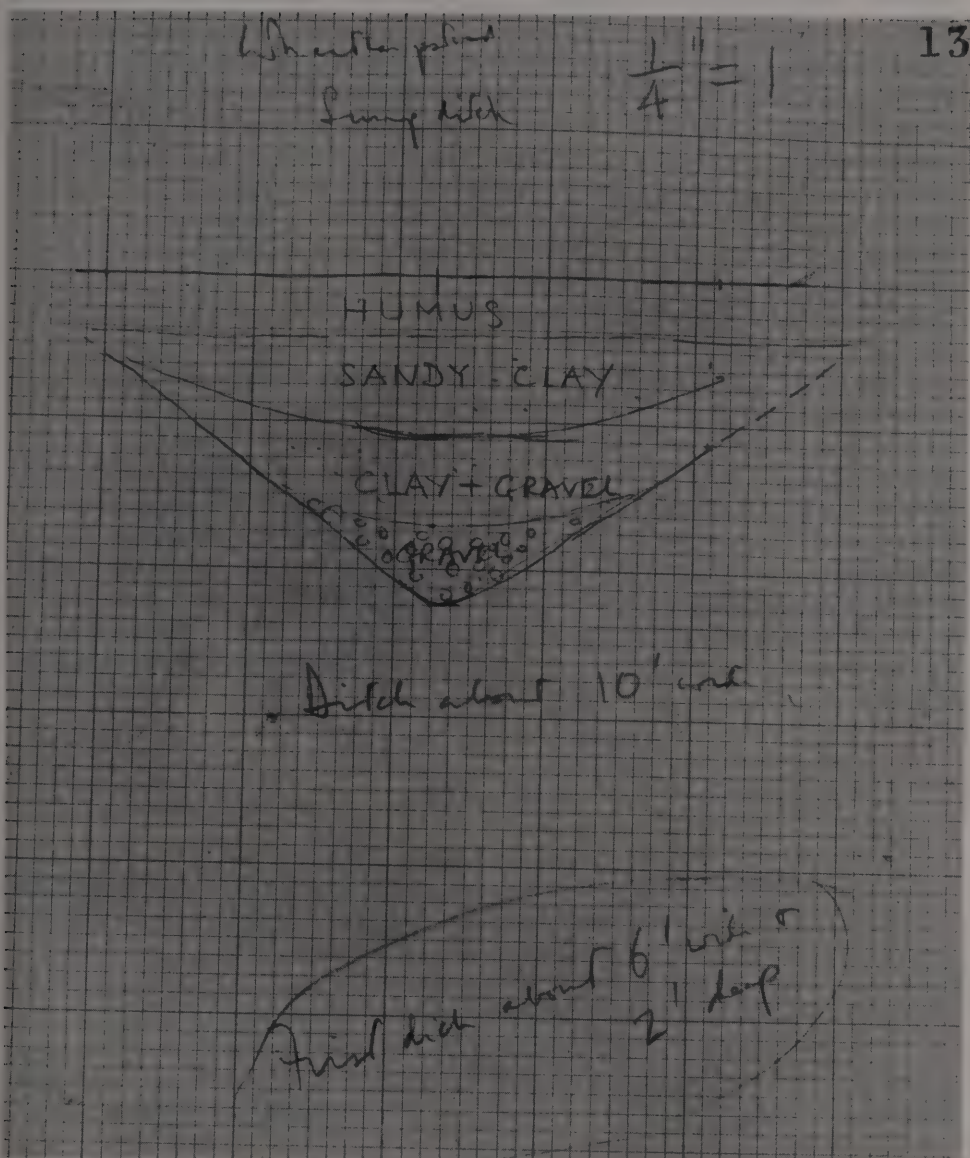


Plate IV. Section drawing of ditch shown in Plate III.



In one of the Verulamium excavation notebooks kept by Wheeler in the 1930s, and now in the Verulamium Museum, is the only other record of the Wheathampstead excavation: it is a sketch of a section, clearly labelled in Wheeler's own hand 'Wheathampstead, Sump ditch' (Plate IV). But which is it? There are two scales, '1/4" = 1"' and 'Ditch about 10' wide', but taking the first of these would make the ditch about 17 feet wide, not 10. A note beneath adds to the confusion: 'First ditch about 6' wide and 2' deep'. There is no evidence for a re-cut; this 'first ditch' description in fact fits the visible measurements of the ditch shown in Wheeler's plate VI. The section drawing, then, ought to correspond to the other, V-shaped ditch, shown in the photograph (Plate III). Visually they correspond and the 'ditch about 10' wide' scale can be seen to be the right one.

These ditches, however, must be further considered below in conjunction with other evidence.

The section across the Devil's Dyke is shown on Wheeler's plate VII, and seems to have accumulated only two or three feet of silt in the pre-Roman period. Wheeler's section is not very detailed: the photograph of the inner bank section, Wheeler's plate IX, cannot reveal any detail although two phases are possibly indicated in the section drawing. Apart from its impressive size, a hearth at the very bottom of the dyke was its chief point of interest, 'underlying the rapid silt' and containing one pot-sherd of the same kind as the rest, 'wheel-turned, i.e. Belgic, pottery' (1936: 20). Wheeler goes on to state that 'this well-stratified sherd enables us to associate the construction of the earthwork directly with the occupation within it'. This seems to imply that no other sherds were found in the section through the defences.

## The pottery

Wheeler (1936: 149) states that 'sherds of upwards of 500 pots were found in the trial trenches at Wheathampstead. They mostly occurred in the filling of two drainage ditches of the type already familiar at Verulamium and Colchester, and there was nothing in the character of the filling to suggest that it represented a lengthy process. The pottery may therefore be regarded as substantially of one date'.

Two points might first be made: it can be seen below that the figure of 'upwards of 500 pots' is a misleading one since the extant pottery is not nearly so large an amount. Secondly, note the phrase 'they *mostly* occurred in the filling of two drainage ditches' – implying that some pottery was found elsewhere.

Figs. 1–4 illustrate the pottery not published by Wheeler in 1936. The notation AB stands for Dr Birchall's pottery types (Birchall, 1965); and Cam. for Camulodunum types (Hawkes and Hull, 1947). The bracketed numbers are those of my own pottery catalogue.

# WHEATHAMPSTEAD REVISITED

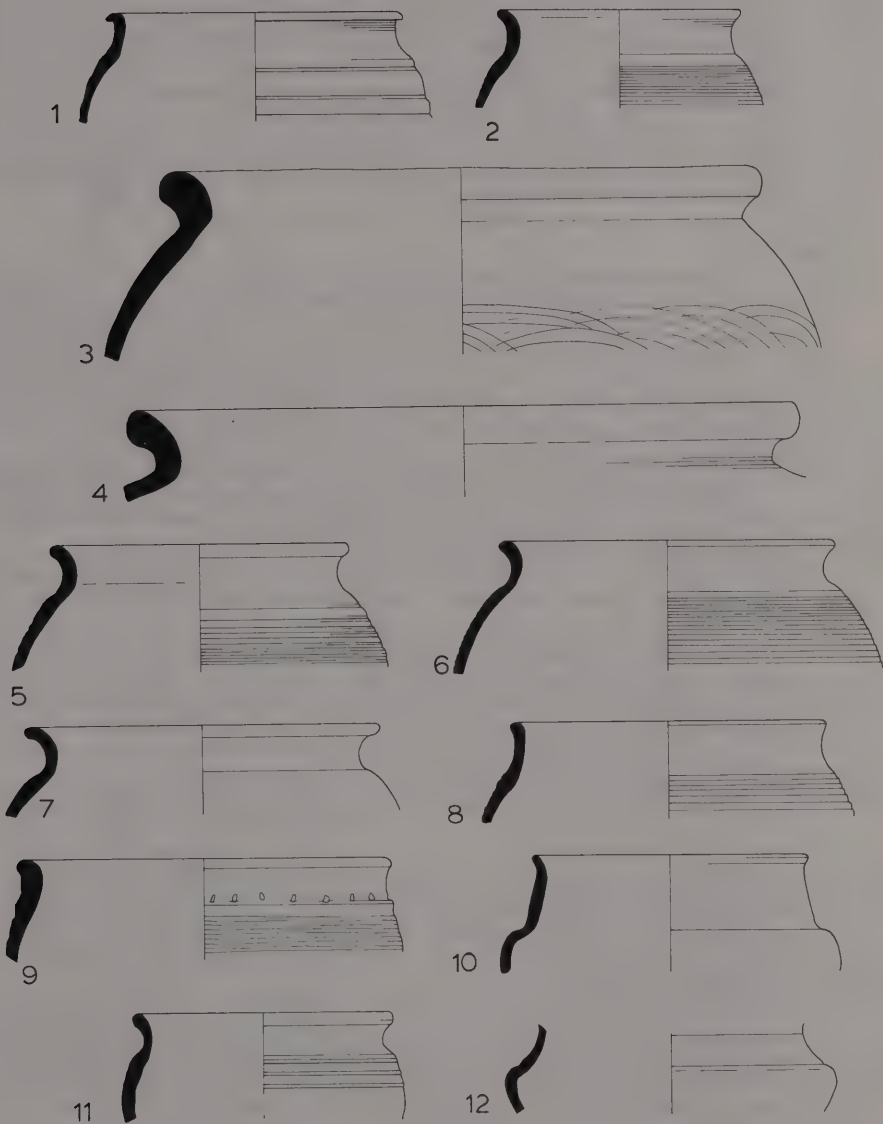


Fig. 1 Area A. Layers 1, 2. Scale 1:4.

*Area A, L.1 (Fig. 1)*

1. (250) 'Wheathampstead 1932. DD 32 Area A 65-66 L.1 (79)'. (Inst. Arch. B.I.1.) Buff grog-tempered fabric with patchy buff-grey inner and grey outer surfaces, outer smoothed, shallow cordons, tooled between. Worn rim. Not conspicuously wheel-made; many slight surface irregularities. A small jar with shallow irregular cordons. The curious little everted rim is unusual for Wheathampstead. Not very many pots with true cordons here, and no good parallels except in a very general way. The potter is not yet using the possibilities of cordoned, wheel-turned shapes that produce the wide, high-shouldered, elaborately cordoned familiar jars: this one is flat-shouldered and shallow.
2. (258) 'Wheathampstead 1932. DD 32 Area A 65-64 L.1 (76)'. (Inst. Arch. B.I.1/8). Brown grog-tempered fabric, softish, brown inner surface and tooled dark grey-brown outer surface, regular wheel-made rilling. One of the rilled jars so very common on Hertfordshire settlement sites of the late Iron Age.

*Area A, L.2*

3. (272) 'Wheathampstead DD 32 Area A 33-32 L.2 (62)'. (Inst. Arch. B.I.1/26). Storage jar, well-made, by hand, grey-brown grog-tempered fabric with pale reddish smooth inner surface and buff outer surface, grey over rim, smoothed, with swirling combed pattern on body. A rather better-made storage jar than usual, and an unusual shape without a neck.
4. (273) 'Wheathampstead DD 32 Area A 34-33 L.2 (62)'. (Inst. Arch. B.I.1/27). Storage jar rim, hand-made but made well and turned to finish, reddish grog-tempered fabric with tooled dark grey surfaces. A standard storage jar rim of a long-lived type, but not well catered for in the Camulodunum series. Cf. Wheeler's published vessels nos. 23-25, below, with comments.
5. (254) 'Wheathampstead 1932. DD 32 Area A, L.2 45-46 (48)'. (Inst. Arch. B.I.1.) Softish brown grog-tempered fabric with red below brown smoothed inner surface and dark grey shiny outer surface, heavy rilling. Wheel-made. It can be seen how standard these rilled jars are. The wheel was presumably essential for their manufacture.
6. (253) 'Wheathampstead 1932. DD 32, Area A L.2 51-52 (15)'. (Inst. Arch. B.I.1.) Reddish brown grog-tempered fabric with smooth brown matt inner surface and patchy dark grey rilled outer surface with red on neck, worn from dark grey. Regular wheel-made rilling. See nos. 2, 5, etc.
7. (261) 'Wheathampstead 1932. DD 32 Area A 42-41 L.2 (57)'. (Inst. Arch. B.I.1.) Pale grey grog-tempered fabric, brownish inner surface and grey outer surface worn to buff in patches. Wheel made, neatly finished. This is a Cam.221, and shows that not all the Wheathampstead pots are coarse and summary with rough surface treatment and irregularities. Cf. Wheeler's published vessel no. 10, with comments, below. This one, however, has a more unusual flaring neck: the type is nearly always closer to upright. (Cf. Faversham Group III, 220 - Philp, 1968: 80).
8. (259) 'Wheathampstead 1932. DD 32 Area A 47-48 L.2 (16)'. (Inst. Arch. B.I.1.) Grey grog-tempered fabric with brown inner surface and tooled grey outer surface, deepish rilling, probably wheel-made. See above, nos 2, 5, 6, but this has a flatter profile than usual.
9. (271) 'Wheathampstead DD 32 Area A 32 L.2 (31)'. (Inst. Arch. B.I.1.) Dark grey grog-tempered fabric with buff surfaces, very smooth but not polished inside, rough outside. Probably wheel-made, but uncertain. An example of the rilled and stabbed small jars found here, less well made and more roughly finished than the thinner, curved, everted-rim jars with rilling that last until the conquest period. This one has an even flatter profile than usual, with faint surface horizontal rilling and an irregular row of shallow depressions made with a rounded instrument.
10. (256) 'Wheathampstead 1932. DD 32 Area A L.2 50-55?'. (Inst. Arch. B.I.1.) Black fabric with ?small grits, rim much damaged and quite roughly made, not on fast wheel. Roughish worn red-grey inner surface and tooled dark grey outer surface. This tall-necked plain jar, which may be compared with Wheeler's published pot no. 9, is a Prae Wood type as well, related to Cam.221 but distinguished by the long neck. There is a similar example in the unpublished pottery from Baldock; and cf. Verulam Hills Field no. 9 (Anthony, 1968: Fig. 3). Not common outside Hertfordshire.
11. (249) 'Wheathampstead 1932 Area A 32 51-52 (15)'. (Inst. Arch. B.I.1/9) Pale grey grog-tempered fabric with patchy buff-brown inner surface and reddish-brown worn rough outer surface. Feels highly fired, and nowhere smooth. Wheel-made. A small and rather rough version of the rilled jars.
12. (267) 'Wheathampstead 1932 Area A (32)'. (Inst. Arch. B.I.1/4.) Grey grog-tempered fabric with grey surfaces, tooled on outside, rim broken off. Wheel-made but not too hard. Drawn because the exaggerated curve and sudden change in angle is very unusual amongst the Wheathampstead pots; related to the Cam.221 group.



# WHEATHAMPSTEAD REVISITED

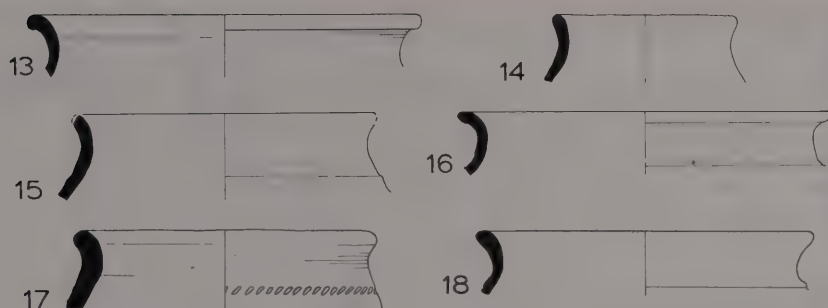


Fig. 2. Area A (ungrouped). Scale 1:4.

## Ungrouped (Fig. 2)

13. (354) 'Wheathampstead DD 32 44-45 (49)'. (Ver. Mus.) Example of one of the two main rim types, rolled. Dark brown fabric with black and other grits, dark grey inner surface, burnished inside rim, and grey outer surface burnt orange-buff at rim. A Cam.221.
14. (359) 'Wheathampstead (58)(59)(62) 34-33'. (Ver. Mus.) Buff-grey grog-tempered fabric with pale grey surfaces, tooled outside but not burnished. Cam.221. These out-turned rims not as common generally as the upright kind, but not particularly rare.
15. (355) 'Wheathampstead DD 32 44-45 (49)'. (Ver. Mus.) A very small example of the other rim type. Unlike much of the pottery this is hand-made, black, probably not grog-tempered; rough dark grey inside and burnished black outside. It does not seem to belong to the same potting tradition as the rest of the pottery.
16. (356) 'Wheathampstead (58)(59)(62) 34-33'. (Ver. Mus.) Thick hand-made coarse dark grey fabric, shows pale yellow inclusions on inside grey rough surface, tooled burnished dark grey outer surface. Compare the other stabbed pots, and especially the comments on no. 9; and cf. also the particular pattern of no. 22.
17. (358) 'Wheathampstead (58)(59)(62) 34-33'. (Ver. Mus.) Brown grog-tempered fabric with pale grey below grey surfaces, tooled on outside. Plain upright rim: cf. Park Street, Site R, no. 3 (Saunders, 1961). Like a rough version of the common plain jar Cam.221, or Cam.223 (Grubs Barn I, nos. 1, 3, 4, 13 (Rook, 1970b), and a few Kent examples).
18. (357) 'Wheathampstead (58)(59)(62) 34-33'. (Ver. Mus.) Pale grey fine grog-tempered fabric, orange below pale grey surfaces, smooth on outside. Plain slightly everted rim with just the beginnings of a cordon.

## Sump ditch (Fig. 3)

19. (274) 'Wheathampstead DD 32 Sump ditch NE side L.2 (119)'. (Inst. Arch. B.I.1.) Storage jar rim, broken off along neck line. Grey coarse grog tempering, tooled dark grey surfaces, well made but slightly irregular rim, turned. Large plain storage jar type.
20. (539) 'Wheathampstead DD 32, Sump ditch NE side L.2 (105)'. (Ver. Mus. 47.2/25.) Perhaps partly hand-made. Lumpy dark grey grog-tempered fabric, dark grey surfaces with some red inside, neck burnished dark grey outside. Pattern somewhat smudged and worn below indents on shoulder. See under no. 9 above. This has all the characteristics of this typologically very early group.
21. (367) 'Wheathampstead DD 32 Sump ditch, NE side, 10?-100. L.2 (132)'. (Ver. Mus. 47.2/32.) Hand-made, thick dark grey fabric with grog and white grits, pale yellow-buff surfaces, smoothed on outside. Cam.229, quite large and thick; cf. one of the unpublished Baldock pots; and Wheeler's published pots nos. 2, 3 (q.v.). Canterbury, Rose Lane, no. 7, is very similar (Frere, 1954).
22. (360) 'Wheathampstead DD Sump NE side (122)'. (Ver. Mus.) Brown-grey grog-tempered fabric, probably hand-made, grey surfaces, burnished outside. Plain rim that could belong to a variety of jar shapes, but unusual here for the flattening just inside the rim.
23. (252) 'Wheathampstead 1932. DD 32 Sump NE side L.2 (122)'. (Inst. Arch. B.I.1.) Brittle grey-brown grog-tempered fabric with grey worn to red on inner surface and tooled grey outer surface. Quite well made, probably on wheel. Thin and quite elegant; apart from the shallow cordons would not be out of place at Prae Wood. An ancestor of the type Cam.218, which is not particularly common in Hertfordshire.

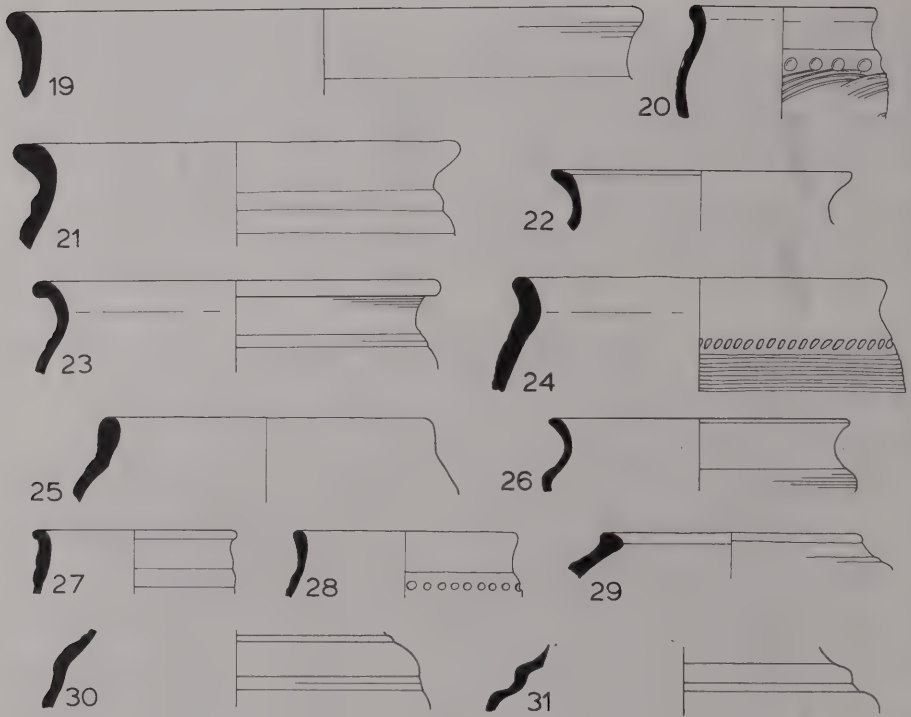


Fig. 3. 'Sump Ditch'. Scale 1:4.

24. (255) 'Wheathampstead DD 32 Sump ditch L.2 NE side 115.105'. (Inst. Arch. B.I.1.) Hand-made, softish dark brown-black, with inclusions, black and pale, large and round, probably grog, dark brown surfaces, roughly tooled on outside. See under no. 9 above.
25. (366) 'Wheathampstead DD 32 Sump ditch L.2 NE side (115)'. (Ver. Mus. 47.2/3? broken away.) Hand-made, dark brown fabric with black and tiny white grits, smoothed dark grey-brown surfaces. A rough closed form that has few parallels. Cf. Loose 1911, nos. 10 and 11 (Kelly, 1971), and other Kent versions of Cam.255 – Bridge Hill, Canterbury, no. 3 (Watson, 1963: Fig. 14); Minnis Bay, Well 10, E (Champion, 1976: Fig. 16); Margate (my cat. no. 31, although this does not have the upright curve). These Kent examples are roughly decorated with combing, but the Wheathampstead pot has no signs of this.
26. (251) 'Wheathampstead 1932. DD 32 Sump ditch L.2 105'. (Inst. Arch. B.I.1.) Softish, brown grog-tempered fabric, worn tooled grey inner surface, tooled grey outer surface. Irregular rim, not made on fast wheel. Cf. Nutfield no. 3 (Rook, 1968b); would come under the Cam. type heading 264, 'cooking-pot with simple rim': this was intended to cover a wide range of such a basic shape and is not as it stands a very satisfactory type.
27. (264) 'Wheathampstead DD 32 Sump ditch NE side L.2 (122)'. (Inst. Arch. B.I.1.) Waster? Much distorted piece but rim keeps straight so perhaps a usable pot. Overfired black and no visible temper. Dark grey surfaces, slightly lumpy on inside. A small version of a Cam.229 sub-group found mostly in Kent but also at Braughing, and close to Wheeler's published Wheathampstead vessel no. 8. Cf. Braughing (unpublished, my cat. no. 139); Loose 1911 nos. 3–6 (Kelly, 1971); Canterbury, Rose Lane no. 28 (Frere, 1954). A very close parallel can be found in the Langenhoe pottery (Red Hill III, my cat. no. 115), but this is Roman.

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28. (362) 'Wheathampstead DD Sump NE side (122)'. (Ver. Mus.) Hand-made black fabric with pale buff inclusions showing on inner surface, dark grey with red patch, and burnished black outer surface. See no. 9 above.
29. (361) 'Wheathampstead DD Sump NE side (122)'. (Ver. Mus.) Hand-made, grey grog-tempered fabric with buff smooth inner surface and burnished dark grey outer surface, irregular tooling. This closed form is the only one of its kind at Wheathampstead; Prae Wood versions exist but are harder, better made, and do not have incipient cordons. There is a sub-group of Cam.229 that this may be related to; but these are finely made and quite standard in shape. The coarser, round, high-shouldered jars with club rims are common at Canterbury (Rose Lane, 20-25), but again always with combing.
30. (269) 'Wheathampstead DD 32 Sump ditch'. (Inst. Arch. B.I.1.) Grey-brown grog-tempered fabric, grey surfaces, tooled outside, entirely usual hardness. Like no. 31; these two a very unusual form for Wheathampstead.
31. (270) 'Wheathampstead DD Sump NE side L.2 (122)'. (Inst. Arch. B.I.1.) Brown grog-tempered fabric, grey surfaces, worn but originally well-defined cordons. Drawn because these cordons, even somewhat exaggerated, are unusual here, and commoner at Prae Wood.

## Unmarked (Fig. 4)

32. (368) (Ver. Mus. 47.2/24.) Coarse pale grey grog-tempered fabric with large inclusions, buff inner surface, actual original surface worn away; dark grey smooth outer surface, not shiny. Wheel made. Holes drilled after firing. A storage jar of the usual type but somewhat small.
33. (365) (Ver. Mus.) Grey grog-tempered fabric with greyish-brown surfaces, tooled outside. Rim of a Cam.221, small and precise. Several of the Canterbury (Rose Lane) jars have such short upright necks (Frere, 1954: figs. 3 and 6, nos. 4, 51, 54).
34. (263) (Inst. Arch. B.I.1.) Greyish grog-tempered fabric with dark grey inner surface worn to red, dark grey tooled outer surface. Worn red rim, once tooled. Presumably wheel-made. Might be a small cup of some sort, but unusually deep overhang on rim, and cups with such a rim shape are rare. Cf. Verulamium Group B, no. 58 (Wheeler, 1936: Fig. 18); and a group of cups like Cam.234.
35. (266) (Inst. Arch.) Small storage jar, coarse soft grey grog-tempered fabric with buff surfaces, untreated. Cf. no. 21 above: thicker, coarser versions of published pots nos. 2 and 3.
36. (262) (Inst. Arch. B.I.1.) Grey grog-tempered fabric with brown inner surface worn to red, dark grey-brown outer surface, tooled on neck, regular filling. Very similar to nos. 37 and 39.
37. (268) (Inst. Arch. B.I.1/7). Brown grog-tempered fabric with dark grey smoothed inner surface, red over rim, dark grey outer surface, tooled neck and rim, heavy rilling. Wheel-made; rough below rilling. The curved, more graceful form of the rilled jar.
38. (265) (Inst. Arch.) Brown-grey grog-tempered fabric with tooled dark grey surfaces, perhaps made on a slow wheel, softish and lumpy. A break at the inside point of neck, a weak point. Very like Wheeler's published pot no. 12.
39. (536) (Ver. Mus. 47.2/15.) Dark brown-grey lumpy grog-tempered fabric with reddish grey inside and dark grey outside, at least partly wheel-made as neck and rim show, with combed decoration. Not burnished, but smooth neck. The flatter-profiled form of the rilled jars, as above.
40. (257) (Inst. Arch.) Sandy-feeling grey grog-tempered fabric with buff inner surface and grey outer surface, roughish to touch. Wheel-made. Diagonal stabbing. One of the stabbed jars as above.
41. (364) (Ver. Mus.) Brown grog-tempered fabric with roughly smoothed grey surfaces. Plain coarse jar without neck; cf. Cam.256, with parallels (large and small) in Essex (Danbury, Great Chesterford); Hertfordshire (Lockleys 55; Brickwall Hill ditch 1 no. 6, large and combed); and Kent (Snargate 4-6; Faversham group 1, 173; Minnis Bay, Well 30, C). A very basic, simple form. (For Danbury, see Hull, 1937: no. 14; Great Chesterford, Rodwell 1976: Fig. 16 no. 21; Lockleys, Ward Perkins, 1938: Fig. 8; Brickwall Hill, Rook, 1970a; Snargate, Kelly, 1968: Fig. 1; Faversham, Philp, 1968: Fig. 23; Minnis Bay, Champion 1976: Fig. 17).
42. (363) (Ver. Mus.) Brown soft grog-tempered with grey surfaces, tooled outside. Very unusual small bowl form, and the only shape of this kind at Wheathampstead.
43. (260) (Inst. Arch. B.I.1.) Pale grey fine grog-tempered fabric, brown worn to reddish inner surface and grey smooth unshiny outer surface, wheel-made; not especially hard. Another everted jar rim with incipient cordon, not well defined.



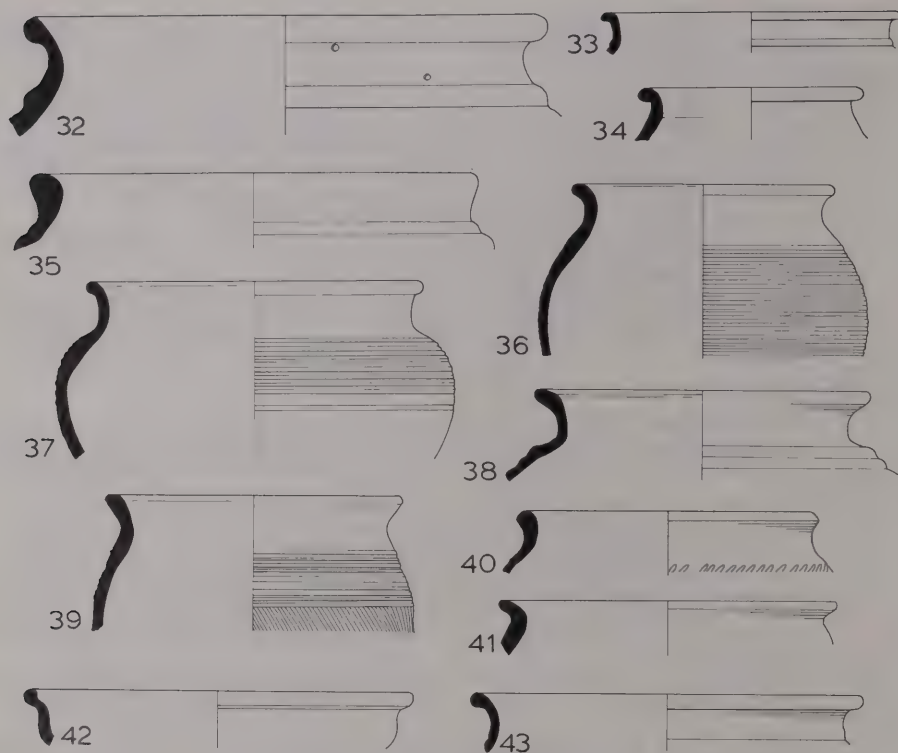


Fig. 4 Unmarked Pottery. Scale 1:4.

### Vessels published by Wheeler in 1936

Those assignable to 'Area A' or the Sump ditch' are as follows:

*Area A*: nos. 10, 20, 23.

*Sump ditch*: nos. 3, 7, 13.

None of the other published vessels have any marking other than 'Wheathampstead 1932'. Some I have not been able to locate in either the Institute of Archaeology or the Verulamium Museum: nos. 4 and 6, plain bases; nos. 21 and 22, rim fragments; and no. 24, a storage jar rim that may have become mixed up with no. 23, since they are very similar.

1. Fine brown grog-tempered fabric, well made on the wheel, dark grey surfaces, originally some burnishing on outside. (Ver. Mus.) This type of cordoned, corrugated tall jar with everted rim is uniquely represented here, although there are some corrugated sherds as seen above. It is not particularly uncommon elsewhere on later sites. The Camulodunum series does not cover these large fine jars since forms 231-3 quite definitely comprise only the

## WHEATHAMPSTEAD REVISITED

narrow-mouthed necked flask versions, and not the wider-mouthed, and commoner jars. They usually have slightly more neck than this one is allowed, but cf. Berkhamstead (Thompson and Holland, 1976: Fig. 3 no. 65), Verulamium Group B no. 52, and Verulam Hills Field (Anthony, *op. cit.*, nos. 5 and 6). None of these jars is particularly early, and the general type is a long-lived one, in Hertfordshire, Essex and Kent, although less common in Kent. The curious stunted pedestal foot, however, seems to be confined to Wheathampstead, where true pedestals did not occur.

2. (Ver. Mus. 47.2/9.) Brown-grey fairly fine grog-tempered fabric, darker grey surfaces, some burnish on the outside. Now mostly lost below the stabbing. Very like no. 3, but slightly narrower and taller neck. The rippled neck is quite common on these Wheathampstead jars, and since it is less precisely made than the firm cordons, in a softer fabric, it is a typologically early feature, reflecting less skilled workmanship on the part of the potter. The stabbing around the wide part of the shoulder is also an early feature, common at Wheathampstead. It is only found on such rippled jars at Wheathampstead and is more common on rilled and combed smaller jars like nos. 17–19 below. Both rippling and stabbing, however, are not invariably early features. The round jar shape with rippled shoulders would be one of the sub-groups of 229 in the Camulodunum series. Cf. Aylesford (AB 44, 54, 74); Minnis Bay (Well 30, F: Champion, 1976: Fig. 17); Chart Sutton, Stodmarsh Road, and Canterbury (3 vessels drawn by me, Kent pots of late pre-conquest and early Roman date, harder and more precise in fabric and shaping); Maidstone (Hayne's Garage, Kelly 1963: 195, no. 2); Braintree (AB 197); Billericay (AB 165); Heybridge (AB 194); Little Hallingbury (AB 142).
3. 'Sump ditch NE side 118'. (Ver. Mus. 47.2/13.) Once restored, now in pieces. Grey-buff small grog-tempered, grey surfaces, some polishing on neck. Hole drilled after firing. A large, wider-mouthed version of no. 2; the same comments apply, but cf. also new unpublished pots from early levels at Baldock, of the same standard of firing and shaping. Also Heybridge (AB 140) and Swarling (AB 6). Apart from these softer, brittle and more roughly shaped vessels from Wheathampstead and Baldock the type does not occur in Hertfordshire as yet: the highly fired, regularly rippled variety found in Kent (in chance contexts) derives from the same sort of ancestry but has the influence of the fast wheel. In Hertfordshire the rippled variety does not last. It is not yet clear how the Essex examples, as common as in Kent, develop.
4. Not found. The curious stunted pedestal found at Wheathampstead, possibly reflecting earlier Iron Age antecedents and not really connected with the true pedestal bases.
5. 'Wheathampstead 1932, 86'. (Ver. Mus. 47.2/19.) Brown grog-tempered fabric, dark grey outside surface but red-grey inside. Definitely wheel-made. Hole drilled after firing. Normal slightly beaded base; these holes quite common generally.
6. Not found. Plain base.
7. '129 DD 32 S Ditch NE side'. (Ver. Mus. 47.2/23.) Grey-brown grog-tempered fabric, grey surfaces, darker outside, once some burnishing. Fairly coarse but well-formed. Interesting and unique form. From shape at break it probably did have a pedestal foot. It belongs to a group of unique vessels with high pedestals that stand beside but in contrast to the quite common and well-defined type Cam.210, of which Hertfordshire has its own distinct series. This vessel is interesting for its precise attention to shape and its corrugated wall, revealing a lot of care in its manufacture.
8. (Ver. Mus.) Coarse dark brown-grey. Some polish but much restored, and this can add a spurious shine to the surface. Restoration makes it impossible to be certain of the fabric. One only, according to Wheeler; this is a plain but interesting shape that is another sub-group of form Cam.229, of tall plain two-angled jars with rippled upper part. Like the other rippled form above, it has several parallels in Kent: Swarling (AB 33); 'Canterbury' (my cat. no. 86); Sturry Hill (my cat. no. 103); Minnis Bay, Well 30, B (Champion, 1976); cf. also Heybridge (AB 195). Verulamium Group B no. 44 possibly represents a later Hertfordshire version. The Swarling pot is from Grave 17, accompanied only by a tall version of the ubiquitous form Cam.221.
9. (Ver. Mus.) Pale grey-buff, coarse, probably grog temper showing where worn, patchy. As Wheeler says this looks as if it is a copy of a metal vessel: it would be a more natural shape in that material. It can be regarded also as a long-necked version of Cam.221; several of these long-necked pots occur at Prae Wood in the unpublished material, and, for example, Group B no. 42 (Wheeler, 1936: Fig. 15). Baldock also has some unpublished examples. But the height of the neck and the small diameter of the base, as well as the thin walls, make this a unique vessel.
10. 'DD 32 Area A LII 48–40 (29)'. (Ver. Mus. 47.2/12.) Grey grog-tempered fabric, grey smooth surfaces, burnished outside. Small hole bored after firing through middle of neck. A

- Cam.221, a plain type which occurs with only slight variations at Crookhams (Rook, 1968a: no. 1); Grubs Barn (Rook, 1970b: Fig. 2 no. 8); Lockleys (Ward Perkins, 1938: no. 37); Brickwall Hill (Rook, 1970a: ditch 3 nos. 4 and 18); St Albans (Corder, 1941: nos. 2 and 3); Prae Wood (Wheeler, 1936); Welwyn Grammar School (Arnold, 1954: nos. 4, 5, and 15); Berkhamsted (Thompson and Holland, 1976: nos. 15, 26, 27, 29 etc); Braughing (Holmes, 1954: no. 11, Fig. 6), all settlements; Swarling (AB 1); Loose (Kelly, 1971: Fig. 11 no. 13); Canterbury (Williams, 1947: Fig. 5 no. 6); and Faversham (Philp. *op. cit.*, nos. 194, 220, 230), all settlements except the first; Great Wakering cemetery (AB 150, 152); Danbury (Hull, 1937: 10); Gun Hill (Drury and Rodwell, 1973: no. 107); and so on: a long-lived and undatable form, very popular but mostly found in settlements.
11. "DD 90-122". (Ver. Mus. 47.2/14.) Now in pieces. Grey brown grog-tempered fabric with grey surfaces, smoothed and slightly spalled on outside. Burnished rim. A jar of the shape of Cam.221, but with a rippled shoulder. No. 12, and no. 36 of my own drawings above, have this, but it is otherwise unusual. Cf. Great Wakering I (AB 151). It can be seen that the general group of forms that comprise Cam.229 is made up of much close variation reflecting the imprecise character of the rippling on these pots.
  12. (Ver. Mus. This is marked as no. 11 but there is no doubt about its being no. 12.) Fairly fine brittle brown grog-tempered fabric, dark grey surfaces. Much restored and now in pieces. See no. 11 above. This is a wider, more bowl-like variety of the same basic shape.
  13. '4 DD 32 Sump ditch'. (Ver. Mus. 47.2/20.) Very brittle and crumbling coarse brown grog-tempered fabric with grey surfaces, once some tooling on shoulder and neck. A ripple-shouldered version of the tall round jars that are like Cam.231-3. This is quite a plain and well-proportioned specimen, but in a brittle, crumbling fabric that should have been fired a little higher. Cf. Heybridge (AB 140); it has a similar shape. Berkhamsted no. 65 (Thompson and Holland, 1976) represents the more regular and commoner version with true cordons. The Prae Wood collection has cordons, not ripples.
  14. (Ver. Mus.) Very coarse patchy orange-grey fabric, like coarse Prae Wood jars. 6 holes drilled in base. Cf. no. 19 below, small plain jar shapes of coarse fabric and combed (and stabbed) surface treatment. A coarse fabric but with no. 15 the 'dominant type'. The standard shape of the Hertfordshire rilled jars, like nos. 15-16, but small. This coarse ware type hardly appears outside Hertfordshire; elsewhere different shapes are popular. In Kent it is mostly the type known as Cam.258: in Essex the small everted rim type Cam.264 is a counterpart to this small vessel here, and can be large and even stabbed according to the Sheepen report (Hawkes and Hull, 1947: 270), but it is essentially late and often post-conquest at Camulodunum, with few parallels elsewhere.
  15. (Ver. Mus. 47.2/6.) Coarse gritty dark brown-grey, grog-tempered, grey coarse outside with orange below, grey inner surface. See remarks on nos. 14 and 16.
  16. 'Wheathampstead 1932'. (Ver. Mus. 47.2/17.) Coarse pale grey, grog-tempered, buff-grey inner surface and patchy dark-grey-buff outside, well made with fine decoration. This may be a 'coarse ware' type but it can be just as well made as the burnished and cordoned jars. This typical artefact of Hertfordshire settlement sites has a long life, since it is here fully developed, alongside the rougher, plainer form represented by no. 18, and is common at Prae Wood, Crookhams, Brickwall Hill (see below), Grubs Barn, Braughing, Lockleys, Welwyn Grammar School, Puddlehill (Matthews, 1976: Fig. 119, nos. 1-4), and Berkhamsted, etc. It is not an Essex form at all until after the conquest, when it spreads and becomes very regular with sharp, deep, regular wheel-formed rilling. One more pre-conquest example survives from Danbury, however (Hull, 1937: no. 13), and some horizontal combing occurs at Essex settlements such as Gun Hill (Drury and Rodwell, 1973: no. 30) and Kelvedon (Rodwell, 1976: no. 8) but on plainer shapes. Horizontal combing is commoner in Kent, but again on locally popular shapes such as Cam.258, and not on the everted-rim jar form like the vessels under consideration here.
  17. (Ver. Mus.) Much restored coarse and possibly hand-made jar of patchy grey-buff fabric. A coarser version of no. 16, with prominent finger tip stabbing and swirling brush-marks. This jar is more or less complete, which is unusual. The type is an early one that survives only in its large thick storage-jar version; but that carries on to the end of the first century AD at least, mostly still in the pre-conquest fabric and treatment. See also nos. 18 and 19.
  18. (Ver. Mus. 47.2/10.) Very coarse probably hand-made dark fabric full of large pale grits and other rubbish, roughly executed decoration. This is the type which represents the very beginning of the grog-tempered pottery series, although it is not always grog-tempered and as in this case is often hand-made. Its occurrence is therefore important for purposes of relative dating, and, unfortunately, the detection of the residual element, for these coarse stabbed upright-rim jars are not always found in early contexts. However, there are several at Wheathampstead, both hand-made and wheel-made. There are more than the 'two or



three' mentioned by Wheeler. These are the earliest late Iron Age pots in the region, and the type is linked to the earliest of the Prae Wood levels as well (Primary levels, no. 2: Wheeler, 1936: Fig. 9). But cf. Lockleys Fig. 7 no. 20, and Welwyn Grammar School nos. 11 and 12. As might be expected, Brickwall Hill has an example in ditch 1, no. 9. A rim sherd from S. Bassett's excavations at Saffron Walden, Essex, as yet unpublished, has the upright rim, stabbed decoration and rilling, but is in a black and gritty earlier Iron Age fabric. Grubs Barn ditch 1 has several; so have Lockleys, Crookhams, and Braughing (unpublished, from the Henderson Collection in Hertford Museum, and awaiting publication by Clive Partridge). Great Chesterford, too, has a small example (Rodwell, 1976: Fig. 16 no. 18); a large one occurs at Widdington, south of Saffron Walden (Saffron Walden Museum, my cat. no. 205). There is a gap in central Essex; the type occasionally appears in south-eastern Essex, such as in a grog-tempered small version at Orsett 'Cock' (Rodwell, 1974: Fig. 6 no. 17). There is a curious pot published from Southchurch that seems to be an earlier Iron Age example (Francis, 1931: 418), but there is also a shoulder sherd from a stabbed and rilled jar with the early Roman burial from Pleshey (May, 1917: Plate III no. 8). Stabbing does occur in Kent but on very different pots. It also lasts to the end of the first century AD on large but well-made, not coarse, storage jars, for example at Hatfield Peverel and St. Osyth, both Essex (my cat. no. 80 and 112). The type in general is not yet known in Essex nearly as commonly as it is in Hertfordshire, if one counts the Great Chesterford-Saffron Walden area as belonging rather to the Hertfordshire orbit than to eastern Essex.

19. (Ver. Mus. 47.2/5.) Much restored. Coarse dark grey with orange patch low on body, no base. The same shape as no. 14, but with upright rim and stabbing on shoulder. See nos. 14 and 18.
20. 'Area A DD 1.32: 49 × 50'. (Inst. Arch.) Much broken large thin-walled jar, pale grey fabric with large rounded black grog tempering, pale red worn inner surface and well-combed grey hard outer surface, tooled rim. The type is, like no. 17, one of the tall wide-mouthed jars related to Cam.231-3, but only perfunctory cordons, and combed surface. These jars are usually harder and plainer, although softer, decorated versions occur in Essex (Heybridge, AB 196; Lion Point, Clacton, unpublished, in British Museum, my cat. no. 41).
21. Unlocated. Apparently a wide bowl with internally thickened triangular rim and vertical lines incised on outside. But cannot be certain if a deep jar or a shallow bowl. Unusual, whatever; and only the one example here.
22. Unlocated. A plain club-rimmed bowl or jar that looks like Cam.257 but is less deep, and has a wider mouth: i.e. a globular form with the rim finished off bluntly. A fairly widespread coarse type: cf. Park Street; Highgate (Brown and Sheldon, 1974: phase I); several at Canterbury, Rose Lane (nos. 1, 2, 20-22). So plain that it is inevitably long-lasting. Only a single example at Wheathampstead.
23. 'DD 32 Area A 45-38 L.1 (66)'. (Inst. Arch. B.I.1/2; another piece in Ver. Mus.) Pale grey hard wheel-made grog-tempered fabric, grey outside, buff inside, buff rim. Two holes, one each side of piece in Ver. Mus., drilled after firing. This, no. 24, and no. 25 are ubiquitous storage-jar rims of a very long-lasting type, for they occur throughout the Prae Wood sequence in just this form, and are very common elsewhere: slightly everted rim, often a shoulder-cordon, and zig-zag and combed ornament below. It is curious that the common form is not included in the Camulodunum type series, because it does last beyond the conquest, in the same coarse grog-tempered fabric.
24. Not found, but very like no. 23.
25. 'Devil's Dyke, 129'. (Inst. Arch.) Coarse greenish-grey fabric with much large rounded grog-tempering, probably hand-made, rough worn grey inner surface and tooled yellowish-grey outer surface, broad shallow incised decoration. Same type as no. 23 above. The marking 'Devil's Dyke' is different from the other marks on the vessels, and it is possible that this was the 'fragment' found in the hearth at the bottom of the Devil's Dyke section (Wheeler, 1936: 20); all the other vessels from Wheathampstead that are marked have the notation DD 82, for Devil's Dyke 1932.

## Undrawn pottery

There were no extra rims labelled 'Area A' but the 'Sump ditch' also contained another storage jar rim fragment from 'L.2 131', and a bag of 25 more rims from

'Sump NE side 122'. Most of these were of the only slightly everted kind, but some were rolled. Two had the stabbed decoration; there were some cordons.

Another bag labelled merely '44-45 (49)' contained 43 small rims, of which four were large storage jars and 16 were the rolled type. Two of these rims were drawn. 15 more rims were labelled '(58)(59)(62) 34-33', and four of these were drawn, above. There were 60 other unmarked rim scraps, three of which appear in the drawn pots above.

All the bases in these bags were plain and flat; one from 'Area A1, Level 1' had a series of holes drilled through it, four of which survived on the sherd; and another similar but unmarked. There were about half a dozen more stabbed sherds, and a number of coarse, reddish soft body sherds from large storage jars with roughly combed decoration, sometimes wavy in pattern. All of these are well represented by the drawn vessels; all are grog-tempered.

There were a few scraps of different fabrics:

3 sherds of a matt black fabric, possibly of an earlier Iron Age tradition;  
the flat base of an Iron Age pot, matt black, hand-made, smooth dark grey inner surface and patchy grey-red outer surface (Sump ditch 105');  
the flat base of a vesiculated grey fabric with reddish surfaces ('Sump ditch L.2 SW side 108');  
one small featureless sandy sherd, pale buff-grey, very gritty;  
5 grass-tempered sherds;  
one soft bright red sherd.

There was also one thick grey grog-tempered sherd with a group of circles impressed into the clay.

The fabric of the pottery is always grog-tempered except where indicated; sometimes overfiring produces a thick, very black fabric in the break but this is often only a localised patch on the vessel and the tempering shows up somewhere else upon it. The coarser pots show no evidence of having been produced on a fast wheel, but they do have signs, especially around the rim, of a final turning.

### **Objects other than pottery found at Wheathampstead** (Wheeler, 1936: Plate LII)

The *tweezers*: (Ver. Mus. 78.2513, in B6; no marking.) Found 'at a somewhat lower but roughly contemporary level' than the brooch. The illustration shows a small strip of sheet bronze folded double, the ends broken off, broader towards the ends than in the middle. Tweezers, and toilet sets, are known in central Europe from Hallstatt C times, but they are commonest from the beginning of La Tène onwards. They are often found with Nauheim fibulae in continental La Tène III contexts (Déchelette, 1927: 777-780). In Britain they are known, for instance, from Glas-tonbury, the Queen's Grave at Arras, Birdlip, Oare, Deal, King Harry Lane at St

Albans, and some late Iron Age Welsh sites, Fishbourne and many Roman contexts. The standard form invariably has the centre of the strip bent into a loop, to provide some spring for a good grip, and an anchor for a ring if part of a set. The Wheathampstead object does, in fact, have this leverage, although it does not appear in the drawing, and the shape is not straight, but subtly curved. It is now in two fragments but undoubtedly was a pair of tweezers.

The *Nauheim fibula*: (Ver. Mus. 78.2600, in B7; no marking.) Found 'at a high level in the trench which contained most of the pottery'. The bronze brooch has the 2-turn coil, internal cord, plain open frame foot and flattened triangular bow with incised decoration of the continental Nauheim fibula; it is more like the continental examples than the drawing shows. The Nauheim fibula is the standard type of La Tène D on the continent: its latest context is in grave 44 at the Titelberg, of Augustan date, and it was replaced by new types by the beginning of the first century AD. Its earliest context is not clear; it occurs at Chateaufort and the Enghelbinsel, Berne, in the Caesarian period, but not at Alise-Ste.-Reine (Alesia). If it was a female ornament, however, as has been argued, one would not expect it at the battle site. The Nauheim brooch found at Entremont, destroyed in 123 BC, is of the plainer type of simple wire construction, but this single example is not sufficient evidence as yet to push the inception of the Nauheim type much before the Caesarian period on the continent (Collis, 1975: 57). Its occurrence in Britain is as scattered as the tweezers: see Glastonbury (Bulleid and Gray, I, 1911: 192, and Plate XL) and Maiden Castle (Wheeler, 1943: 258 – unstratified). It is not a characteristic of the grog-tempered 'Belgic' pottery sites of south-eastern England, where Colchester brooches and other types beginning in the Augustan period on the continent are typical.

The *triangular loomweights* are a common type found on Iron Age sites all over lowland south-east England, and in Belgium and north Germany (see Champion, 1975: Fig. 2 and appendix giving the distribution). They occur on sites of a fairly wide chronological range in the Iron Age, but rarely on sites whose pottery is the grog-tempered 'Belgic' type of the latest Iron Age in south-eastern England.

None of these objects other than pottery had any surviving indication of their exact provenance. Much searching in the Verulamium Museum produced neither the iron knife nor the spindle-whorl. (The pointed end of the knife has now been found in the Museum, June 1979.)

Beside these published objects, the Verulamium Museum contains a box of daub and fired clay, and another labelled 'charcoal, iron slag, and animal bones'.

The *fired clay* comprises three small bags of featureless lumps of fired clay from Area A, and a collection of unmarked larger lumps of two types. These are large thick pieces with wattle-marks, grey or red, with one more unusual and well-shaped piece (Fig. 5); and one or two long, thin grass-marked pieces of buff clay like the thin slapped-on lining of a kiln or similar structure.

It is perhaps worth recording here that other small fired clay lumps were picked



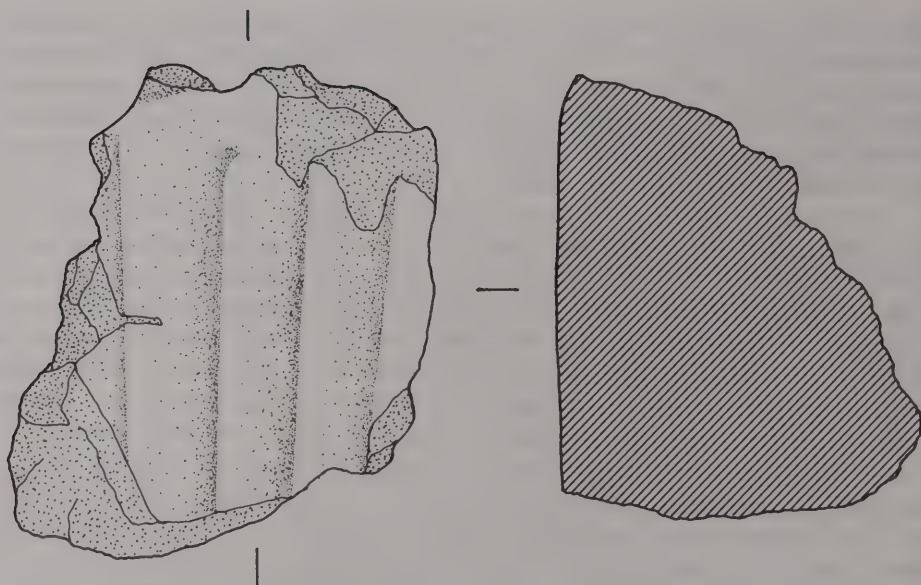


Fig. 5. Unusual piece of fired clay from Wheathampstead: red, brittle, with burnt flint inclusions; edge shaped with a knife. Scale 1:2.

up on the surface of the site by Mr F. H. G. Montagu-Puckle of the Verulamium Museum in 1972, at a spot near the probable south-west corner of the fortification (inf. C. Saunders).

### The cremation

As well as a small amount of charcoal from 'Area A 47-46 (20) L.2', and a round lump of iron slag from 'Area A W side 2' 5" under plough', there were two paper bags containing bones. The site's acid soil means that bone does not normally survive, but these fragments appeared burnt, and the larger sample looked surprisingly like a cremation. Both bags were submitted to Mr Don Brothwell at the Institute of Archaeology, who reported as follows:

1. 'DD 32 Sump ditch L.2 (116) 7.10.32'.
  - (a) 3 large fragments of decayed bone shaft plus many very small pieces. Bone could be large (cow/horse) size mammal *or* man.
  - (b) 3 fragments of a tooth or teeth. The morphology indicates a bovid, presumably domestic cattle.
  - (c) 1 piece of pot (this is small, plain, and grey grog-tempered - IMT).

2. 'DD 32 Ditch 3 22.9.32'. Numerous fragments of bone mixed with pieces of charcoal and surrounding earth matrix. Although not one bone specimen is absolutely conclusive, 19 pieces are sufficiently large to show some morphology, from which it may be tentatively concluded that one or more humans are represented. One fragment in particular is strongly suggestive of human tibia shaft. The condition of the bones, white with some fissuring, distortion, and patchy greying, suggests that the material was all cremated.

This putative cremation is a puzzle, since it is entirely unassociated with anything else; and the label is the chief surprise, since this is the first, and only, indication of 'Ditch 3'. If, as Chris Saunders has suggested to me, Wheeler put down several trial trenches within the interior of the fortification, 'Ditch 3' could have been almost anywhere. The piece of iron slag from Area A was found at 2 feet 5 inches 'under plough' so this provides a second indication that Wheeler did probe more of the interior than he showed on the published plan, and also that 'Area A' is definitely not a reference to the section through the defences, which are not under plough, and which in fact seem to have contained no pottery (see above).

The section drawing of the V-shaped ditch (Plate IV) is labelled, by Wheeler himself, the 'Sump ditch', and this is *not* the shallow, rounded ditch in Wheeler's Plate VI and apparently corresponding with the main ditch length on the plan. The latter is undoubtedly what Wheeler calls the 'first ditch' on the section drawing.

It might be useful, at this point, to summarise the indicated features:

1. The main bank and ditch, sectioned at A-B on Wheeler's plan.
2. The main ditch length at 'Site C' on the plan, described as 'first ditch' on the section drawing.
3. The ditch with V-shaped section, sketched by Wheeler and described as 'Sump ditch'.
4. The ditch that is indicated in dotted lines on Wheeler's plan, meeting (2) at right angles.
5. 'Ditch 3', containing the cremation.
6. 'Area A': no details, except that it comprised at least two layers, and was dug at least 2 feet 5 inches deep.

No. (4) could be the same as (3), if Wheeler was inconsistent and the 'Sump ditch' that so much of the pottery comes from is (2), the more substantial feature. (4) could equally be identical with no. (5). In fact, we cannot now be certain of the identity of any of these features except (1).

The compilation of dates given on the bags containing the Wheathampstead finds provides the following:

September 1932:	10.9.32	Area A	(daub)
	12.9.32	Area A	(daub)
	13.9.32	Area A	(daub)
	16.9.32	?	(tweezers)

	22.9.32	Ditch 3 (cremation)
October 1932:	4.10.32	Area A (slag)
	7.10.32	Sump ditch (bones)

(The brooch label is marked 16.xi.32, which seems wrong and should very likely also read 16.ix.32. No other dates have survived; none of the pottery has any associated dates.)

### Wheathampstead's context

A date in the second half of the first century BC is indicated for the Wheathampstead finds: there is nothing to show that the site, as known, lasted to the time of the first Gallo-Belgic imports to Britain, and the finds other than pottery also indicate an early date. It is not yet possible to give a date for the beginning of this early period, but there is nothing to suggest that the *terminus post quem* can be placed earlier in the first century BC than the time of Caesar, and the brooch suggests the post-Caesarian period. Wheathampstead's chief chronological interest is not whether it was the stronghold of Cassivellaunus, for there is nothing specific to indicate whether it was or not, and such a supposition does not, besides, cast any light on the absolute dating of these finds. The site, however, is a 'hill-fort' of the kind found on the low eminences of eastern England in the Iron Age, and seems to have been succeeded by the extensive 'oppidum' of Prae Wood: a sequence that happened at other major settlements of south-eastern England in the last 50 years of the pre-conquest period.

Other sites in Hertfordshire, with Wheathampstead, comprise a group of settlements which should relate to the early group of rich burials called the 'Welwyn' phase by Stead (1976: 401). There is material from Baldock and Braughing, and possibly Hertford, which when published should add much to our knowledge of the period. The ditches found at *Brickwall Hill*, Welwyn (Rook, 1970a), are especially interesting because they were found not very far away from the Welwyn and Welwyn Garden City early burials, and because they reveal an interesting sequence. Of four disconnected ditch lengths, ditches 1 and 2 produced pottery comparable to Wheathampstead, and ditch 3 pottery comparable to Prae Wood. Ditch 4 was Roman. And, especially important, part of a 'La Tène II type' fibula with a knob on the bow was securely stratified in Ditch 1.

The excavator suggested that ditches 1 and 2 might have been part of a single ditch; this is possible, but they were widely separated and, while the sample is admittedly not large, the vessels from ditch 2 seem on examination to be better defined, with sharper and more regular grooving and rilling. Ditch 3 has Gallo-Belgic copies, so the rilled jars of the standard Hertfordshire type, just like those at Prae Wood and Crookhams, are here later in date. It seems that these jars do not occur in ditches 1 and 2; also notable is the sudden great increase in the range of interesting



types in ditch 3, with its early attempt at a jug and its unusual pedestalled bowl, a Cam.221 with a pedestal, otherwise unknown. Ditch 1, however, has in no. 9 a specimen instantly recognisable at Wheathampstead, and nos. 8, 10, and 12 are also closely paralleled at Wheathampstead. Brickwall Hill ditch 1 has a greater proportion of the upright-profiled, thickened-rim coarse jars, seen again in ditch 2 nos. 5a and 5b. Ditch no. 6 is an interesting plain large storage jar; ditch 2 no. 9 is the more usual long-lived rim type. Ditch 2 no. 8 is also called a 'storage-jar'.

The non-Wheathampstead types that occur in these two ditches are especially interesting, because each ditch has a true pedestal base. Ditch 1 no. 5 is the usual and very common type Cam.203; ditch 2 no. 11, however, is flat. This is not uncommon either; although it did not occur at Camulodunum there are examples in Hertfordshire, Kent, and Essex, early and late. Ditch 3 no. 13 is very typical; Dellfield, Berkhamsted, no. 60 is another example (Thompson and Holland, 1976: Fig. VII). It seems, then, that the absence of pedestals from Wheathampstead is possibly fortuitous; the sample was not large.

Ditch 2 no. 6 at Brickwall Hill can be compared with Wheathampstead no. 8 and the group of Cam.229 type rims; it can also, however, be postulated as the ancestor of a very distinctive Prae Wood type represented amongst the published Prae Wood pottery by Group A no. 7 (Wheeler, 1936: Fig. 10). Like the rilled jars, this is a Hertfordshire type and is not found elsewhere.

Ditch 2 no. 10 shows that lids are already in use in this early period; and no. 7 is one of the Cam.229 bowls group. This bowl type does have quite a long life but is well represented in early contexts; cf. Verulamium primary levels 3 (Wheeler, 1936: Fig. 9); Grubs Barn I no. 2; Faversham Group I no. 170, but also Group III no. 204 (Philp, 1968). An undated vessel from Hadleigh (Southend, Essex), unpublished (my cat. no. 53), is very similar to the Brickwall Hill example, and there are also similar ones at Gun Hill in the same part of Essex.

It might here be pointed out that, as at Wheathampstead, there are instances at Brickwall Hill of cordoned pots, quite regularly made; although they were not included in the published material. One cordoned jar neck and rim is similar to Grubs Barn I no. 5, but narrower, with a sharper cordon, and without the decoration; cf. also Crookhams 20A. This is essentially a later type, seen on Group B jars from Verulamium, and several of the large jars from Verulam Hills Field (Anthony, 1968).

All of the Brickwall Hill pottery is grog-tempered. It is a pity that the sample from these two early ditches was so small, because we cannot be certain if the greater regularity in manufacture and finish of the ditch 2 pots, and its inclusion of cordoned jar forms, is an indication of a slightly later date or is merely an accident.

Brickwall Hill is in the general area of the early group of 'chieftain' graves, and the short ditch lengths found at *Grubs Barn* (Rook, 1970b), were very close to the Welwyn Garden City grave, with its attendant cemetery. The Grubs Barn pottery also deserves consideration to see how it relates to Wheathampstead and Brickwall

Hill on the one hand, and to the Welwyn graves on the other. The excavator considered the pottery from ditch 1 to date to the first 30 years of the first century AD, but the likeness to the Prae Wood pottery seen by him in the early Grubs Barn pots does not now hold up on examination. There is no sign of any Gallo-Belgic influence, although it was again only a small sample. Nos. 11, 14, 15, 16 and 19 are the coarse, thick, stabbed and rilled type that as we have seen can have a very early relative date. Of the burnished vessels, nos. 1-3 are much thicker and simpler than Verulamium Group B, no. 38, and nos. 6, 12, 13, and 18 have very little to do with the thin, hard, finely made mortar shapes represented by Verulamium Group B no. 35b. The Grubs Barn pots are altogether thicker, softer, and less well defined. No. 8 is a Cam.221, the very common type (cf. Brickwall Hill II no. 8). No. 16 is sharper than the drawing shows, but fired quite hard and black. Nos. 1, 3, 4, and 13 are very similar to Cam.223, which occurred, rarely, at Sheepen in 'thick, native ware' in period I (Hawkes and Hull, 1947: 262); there are two unpublished and unassociated similar vessels from Canterbury and Linton near Maidstone (my cat. nos. 106 and 244). The rather ill-defined detail, however, makes them similar to the bowls of Cam.229 type, to which groups Grub Barn ditch 1 no. 2 is closer. We have already looked at this category under Brickwall Hill ditch 2 no. 7. Grubs Barn no. 5 can be related to Brickwall Hill and Wheathampstead, and to the long-lived cordoned wide-mouthed jar type. No. 6 is a Cam.211 but with only one cordon. It is true that the Verulamium mortar shapes are also part of the 211 group, but it is a large and varied one and the 'mortar' shapes are a particular and specialised type that has not appeared at Grubs Barn. The straight-walled cordoned cups of Cam.211, however, occur at Boxford, Ardleigh, Lexden, Canterbury, Holborough (my cat. no. 245) and even Cheriton and Snailwell: they can thus be both early and late. Grubs Barn Fig. III no. 20 is a similar vessel from the surface around the 'hearths', which are early post-conquest. (For Boxford, Owles and Smedley, 1970: Fig. 15 no. 1; Ardleigh, AB 127; Lexden, AB 176, 177; Canterbury, my cat. no. 99; Cheriton, Tester and Bing, 1949: no. 28, late first century AD; Snailwell, Lethbridge, 1953: Fig. 3 no. 53: 18.)

Ditch 1 no. 7 is a more interesting type, perhaps, because it is Cam.209, the type of cup that was predominant at Swarling. Grave 13 there had three of these cups, as well as two of the common Cam.203 type of pedestal urn and two early fibulae, humped with moulding on the bow, and a 'hood' over the internal cord; the grave also contained the wooden bucket. Grave 18 had another of these cups, with a small, flat-based pedestal urn, one of the corrugated jars exclusive to Kent, and a pair of straight-bow fibulae with fretted catch-plate and external cord.

That the type is not exclusively early, however, is shown by the admittedly less well-defined version in Aylesford 'Family-Circle' grave B (AB 56), which was accompanied by a copy of a Gallo-Belgic platter. This does not however detract from the probably early date of the well-shaped and properly corrugated original Swarling specimens, with good parallels at Stone (Cotton and Richardson, 1941: nos. 6, 8, 9);

Borden (Worsfold, 1948: nos. 3, 4, and 8); Canterbury, Rose Lane (Frere, 1954: no. 37); and Danbury in Essex (Hull, 1937: no. 6); the small cup in the Colchester mirror grave, no. 5 (Fox and Hull, 1948), may also belong, and so may large ones from Wendens Ambo (unpublished), and Lockleys (no. 52). The Grubs Barn version, however, is not as well-defined as these. We can also point to Hertford Heath (Holmes and Frend, 1957: fig. 4 no. 6 – two examples), and Boxford 1966 no. 13 as low walled versions similar to Grubs Barn ditch 1 no. 18. The Hertford Heath ones could, like the Swarling examples, be of an early date. It can be seen that the Grubs Barn ditch 1 pottery could, then, have a date rather in the late first century BC than in the first century AD. How it related more exactly to Wheathampstead and Brickwall Hill it is impossible to say, but it is interesting to compare the early settlement wares with the more-or-less contemporary rich burials nearby.

The main *Hertford Heath* grave has already provided one parallel to Grubs Barn, although, like the Swarling pots, it has true corrugated walls and not false cordons. The standard of shaping, if not the fabric, is generally higher in the cemetery pots: clearly more care was taken over them. Not for the cemeteries were the coarse rilled and stabbed jars, except, oddly, at Aylesford, where their true context has been lost except for Grave X, and there the standard of workmanship is often not very high; and Swarling Grave 4; the accompanying pots need not be particularly late, and the Swarling pot was accompanied by an iron fibula with an internal cord that ought to be early. (The Aylesford grave's associations, however, cannot be taken without some reservations, since it has had to be reconstructed from muddled sources and is not necessarily reliable.)

The Grubs Barn ditch is not likely to be as early as Wheathampstead, since the latter has none of the cup forms, and comes close to Grubs Barn only in the coarse stabbed and rilled jars. This position for Grubs Barn ties in neatly with the nearby chieftain grave, the *Welwyn Garden City* burial, which was particularly rich in pottery but which included a fairly bizarre collection of unique types as a result. Its pre-Gallo-Belgic jugs and platters make it late in the first century BC, although before the introduction of the first true Gallo-Belgic imports. The *Welwyn Garden City* vessels are all grog-tempered apart from the three thought by Stead to be imports, the platters and large jug nos. 29, 30, and 36 (Stead, 1967). Its date, confirmed by the amphorae and the silver vessels, is useful for indicating some dating evidence for those types which do have parallels elsewhere. It is thus only too typical that quite a good parallel, but a unique one, can be found for the curious little cups 14–17 in Verulamium Group C no. 5.

The *Welwyn Garden City* pedestal urns are the usual kind, although the tall narrow necks and cordoning of nos. 1 and 2 are not usual at all. There are no parallels for the narrow necks, but the cordoning can be compared with that on some of the Kent cemetery urns. It occurs occasionally in Essex, notably at Billericay (AB 170, 200, 219), but does not otherwise appear in Hertfordshire. The common shape is no. 3, matched in the four *Welwyn* graves, with a wide mouth and short plain neck on a



large bulbous body and a Cam.202/3 foot. There is a variety of pedestal form at Welwyn Garden City: no. 4 is almost flat but has a slight shaping to show that the shape is not deliberately the flat form. This ill-defined dished kind is not a matter of a late and degenerate form. The Cam.201, the so-called 'dice-box' pedestal seen in nos. 1, 2, 5, and 7, is commonest in the Colchester area (Colchester, Ardleigh, Lexden, Boxford): there is one at Aylesford and one at Swarling, neither with any more datable associations. There are no other Kent instances, and the type is just as rare in Hertfordshire. Like the other Welwyn burials, and others elsewhere, the large pedestal urns are accompanied at Welwyn Garden City by small cups, sometimes with high pedestals: there are here merely more of them. Nos. 8–11 are all Cam.212, and well made and well defined, unlike the Grubs Barn cups, but just like the ones in Welwyn grave A (AB 103) and B (AB 105). These are the earliest of this kind, for most other examples with indications of date are later (Roots Hall, Prittlewell, Essex, my cat. no. 219, early post-conquest, for example), and a version was one of the types made in the conquest period kilns at Highgate (Brown and Sheldon, 1974: Fig. 2).

The other small cups at Welwyn Garden City are more unusual. No. 13 is a Cam.214, which just means an unconstricted 212, but is not a common variation except in a completely plain form and despite two at Aylesford (AB 61, 83) is not closely dated. No. 18 is a good specimen of the Hertfordshire version of Cam.210, the 'mortar' shape, although it may ultimately be linked with the Gallo-Belgic form Cam.51. Nos. 23 and 24 are small versions of the usual Cam.221, and nos. 31 and 32 are a widespread but hitherto unisolated form that is a variety of Cam.249. Welwyn Garden City satellite cemetery has one, no. 5; it can be quite late, because Brickwall Hill III no. 15 is an example of this form, and there is a post-conquest one from Chelmsford. It occurs in Kent at Bexley (Caiger, 1958: no. 9), but is more common in Essex. Welwyn Garden City no. 20 is a variety of this group but has the unique addition of a pedestal; no. 19 could be a unique cordoned version. But nos. 14–17 have only the late Prae Wood parallel given above, while 21 and 22, and 25, are unique. The jugs nos. 33–35 are also unique and belong to the interesting early attempts to make jugs in the grog-tempered fabric, complete with the practice of plugging the handle through the wall of the pot.

While the Welwyn Garden City grave has features that place it late in the period before first introduction of Gallo-Belgic pottery, there is no doubt that it does belong to such an early phase, alongside the four graves in the *Welwyn* cemetery a few miles away (Birchall, 1965: 305–6). These four were much poorer in pottery but A and B both had amphorae and metalwork of similarly later first century BC date, and Welwyn B had two silver cups similar to those in the Welwyn Garden City burial. The pots are very like the ordinary pedestal urns and small cups of the latter burial; Welwyn C has a small jar (AB 107) which strikes the only possible later note in all four Welwyn graves since its shape may be reminiscent of butt beaker shapes. But not all jars with approximately equal rim and base diameter, with the widest part half-way down the pot, need have butt beaker influence. However, the crucial graves

are Welwyn A and B, and Welwyn Garden City. They can be shown to belong to a period in the later first century BC and approximately contemporary with the settlement pottery of Wheathampstead, Brickwall Hill I, and Grubs Barn I. That the makers of Wheathampstead pottery were capable of making fine, well-made, sharply defined pots of the standard of the burial wares can be seen in some of the Wheathampstead pieces, granting the fact that the Wheathampstead pottery may not all have been manufactured at a similar date, and indeed does not seem to have been when one considers the tentative shapes of some of the coarser and less well-made vessels. Grubs Barn ditch 1, however, may be felt to be approximately contemporary with the Welwyn Garden City burial, and the difference in quality is marked. The Welwyn Garden City fabric may be no harder or better than that of Grubs Barn, and the vessels easily broken, but the pots used for burials are more neatly made and show a greater variety of form than the settlement wares. It is interesting, however, that most of the Welwyn Garden City pots show signs of wear on rim and base; they are sometimes distorted and not very even, although they reveal all the signs of their manufacture on the fast wheel. The contrast between the burial and settlement wares of a fairly small area at approximately the same date is very clear: but once the Prae Wood sequence begins in the same area, the difference rapidly disappears, and the settlement wares become much more varied.

## Conclusion

It has not been my intention in the above to indulge in destructive criticism of an excavation carried out nearly half a century ago and intended then only as a sidelight on the far more extensive campaign at Verulamium; rather, I would hope that the preceding paragraphs provide some indication of the potential of this site, and its importance at the very beginning of the last phase of the pre-Roman Iron Age in south-eastern England. This period sees the change to a new pottery fabric with grog as a tempering material, and the making of pottery on the true potter's wheel with all the potential that this had for new and exciting shapes and artistic expression. Wheathampstead has produced some of the earliest results of this change that we yet know of, and we still know so little about the site.

There is apparently no plough damage at present of underlying features, since no sherds or other fragments appear on the surface (inf. C. Saunders); but the site should not be forgotten, since it holds out great promise of the light it might shed on this difficult period of transition. The first century BC is murky because the excavations have not taken place that could give us the information we need, about a period when the initiative in trade is about to pass from the Hengistbury area to south-eastern England; and if the opportunity were to arise, Wheathampstead should be given the chance to reveal itself to modern archaeology.

## Acknowledgements

I would particularly like to thank Chris Saunders of the Verulamium Museum, and his colleagues, for all the help they have so willingly given me; Don Brothwell of the Department of Human Environment at the Institute of Archaeology, for examining the bones; Tony Rook, for allowing me to examine pottery from his own excavations; and Ian Stead, Timothy Champion and Steve Bassett for kindly giving me permission to refer to their own unpublished material.

## Abstract

The published finds from Sir Mortimer Wheeler's excavation at the late Iron Age 'hill-fort' at Wheathampstead, Hertfordshire, are re-assessed in conjunction with the presentation of unpublished material from the same excavation. An attempt is made to define, as far as we can now tell, the trenches which Wheeler dug; it is clear that there was more to the excavation than Wheeler's published summary indicated. The pottery is compared in some detail with similar Hertfordshire material, as a preliminary in the writer's comprehensive study of grog-tempered 'Belgic' pottery in south-eastern England. It is concluded that the site has great potential for shedding light on the transition from the hand-made earlier Iron Age pottery tradition to the wheel-made 'Belgic' technique, a change that urgently needs some useful dating evidence.

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# Cornish souterrains in the light of recent research

by PATRICIA M. CHRISTIE

The souterrains of Scotland, Ireland and Cornwall represent a curious phenomenon in the protohistoric architecture of the British Isles. The monuments are hard to date with precision, though recent work has helped in this, and their original function remains unknown. Their distribution is equally puzzling; abundant in Scotland and particularly in Ireland, (Grealey, 1973) their absence from Wales and England, apart from the extreme south-west, is hard to explain. However, it is not my intention to enter into a general discussion of souterrains in the British Isles, but rather to describe briefly the nature of the group occurring in the Cornish peninsula and the information provided by recent excavations there.

Souterrains in Cornwall, locally known as 'fogous' from a late Cornish word meaning 'a cave' (Thomas, 1966: 79) form a class of monument which can be distinguished from other pre- and proto-historic monuments and from later structures such as 'tatie hulls' (potato holes) by certain characteristic features. These may differ in detail yet they unify the group within the area under discussion and connect it with souterrains elsewhere. These features, recognised in the pioneer work by Hencken (1932) and Clark (1961) as well as in descriptions by the older antiquaries, may be defined as follows: Fogous

- (1) are partly or wholly subterranean, built in massive trenches, though above-ground examples exist;
- (2) consist of a main passage built of dry-stone walling, usually corbelled inward and roofed with massive capstones and frequently orientated east-west or northeast-southwest;
- (3) contain subsidiary chambers and small, narrow side passages (often known as 'creeps');
- (4) are associated with settlements, some fortified;
- (5) normally possess more than one entrance. (The emphasis placed on this last point by Mrs Clark is not supported by recent excavations).





Fig. 1 Distribution map of known Cornish fogous.

Fogous are restricted not only to Cornwall, but to specific regions within the county, namely the Land's End peninsula (West Penwith) and the Falmouth region, with a dubious outlier in the north (Fig. 1). Out of the sites known (Russell, 1971) – or believed once to have existed – several have been destroyed in recent years and only 9 survive today (Appendix).

Fogous were first noted and described in the 18th century by antiquaries such as Dr William Borlase and others. Later, in the 19th century, some excavation was carried out by various local antiquaries and more detailed plans and descriptions published, notably by William Copeland Borlase, J. T. Blight and W. C. Lukis. The

first attempt to gather the fruits of this earlier work together and present it in its context within the Cornish Iron Age was made by Hugh Hencken in the 1930's and this remained the only general reference work on the subject until the late Evelyn Clark published *Cornish Fogous* in 1961. This work incorporated the results of the only excavations this century on fogou sites, such as those at the Courtyard House village of Porthmeor and Mrs Clark's own work at Lower Boscaswell and Boleigh, described below. The present writer has drawn heavily on the fund of information contained in this book, as well as on that provided by Hencken (1932) and earlier scholars.

No further work was done on Cornish fogous until the recent series of excavations at Carn Euny (an account of which forms the second part of this paper) though attention has been given to souterrains and related problems of Cornish archaeology by Professor Charles Thomas, notably in two papers delivered at conferences dealing with aspects of the British Iron Age (Thomas, 1966 and 1972). A brief description is therefore given of those key fogou sites in the peninsula which in all but one case are well known and still survive today, before going on to discuss how the recent excavations at Carn Euny have affected earlier observations.

### **Pendeen Vau (Fig. 2, 4)**

This fine fogou is set within the farmyard of Pendeen Manor, a 16th century farm house which appears to have been built within a considerably earlier settlement near the north coast, 5 miles (8 km) west of Zennor. The Y-shaped structure is partly above ground and enclosed within a massive stone hedge. (Cornish 'hedges' consist of double stone walls filled with earth and are still a feature of the landscape, though rapidly vanishing as a result of modern agriculture. Many are of massive proportions and some may have a considerable antiquity.). The fogou consists of a curved passage 55 feet (16.8 m) long forming the stem and one arm of the Y, built of dry-stone walling, corbelled inward and roofed with capstones, with entrances at each end, though it is not certain that both of these are original. A subsidiary passage forming the other arm of the Y is not stone built but hollowed out of the natural subsoil of decayed granite (rab) and entered by an entrance 2 feet 6 inches (76 cm) high. In recent years the interior has become so filled up that one is obliged to crawl even in the main passage. Although this fogou is both accessible and well known – and has been since Dr Borlase's description of it in the 18th century (Borlase, 1769: 293) – little detailed information exists regarding the structure or the finds. Massive field walls – one containing a storage pit believed to date from the pre-Roman Iron Age (Clark and Ford, 1953) – exist in the neighbourhood and reinforce the view that the fogou may have belonged to a settlement.

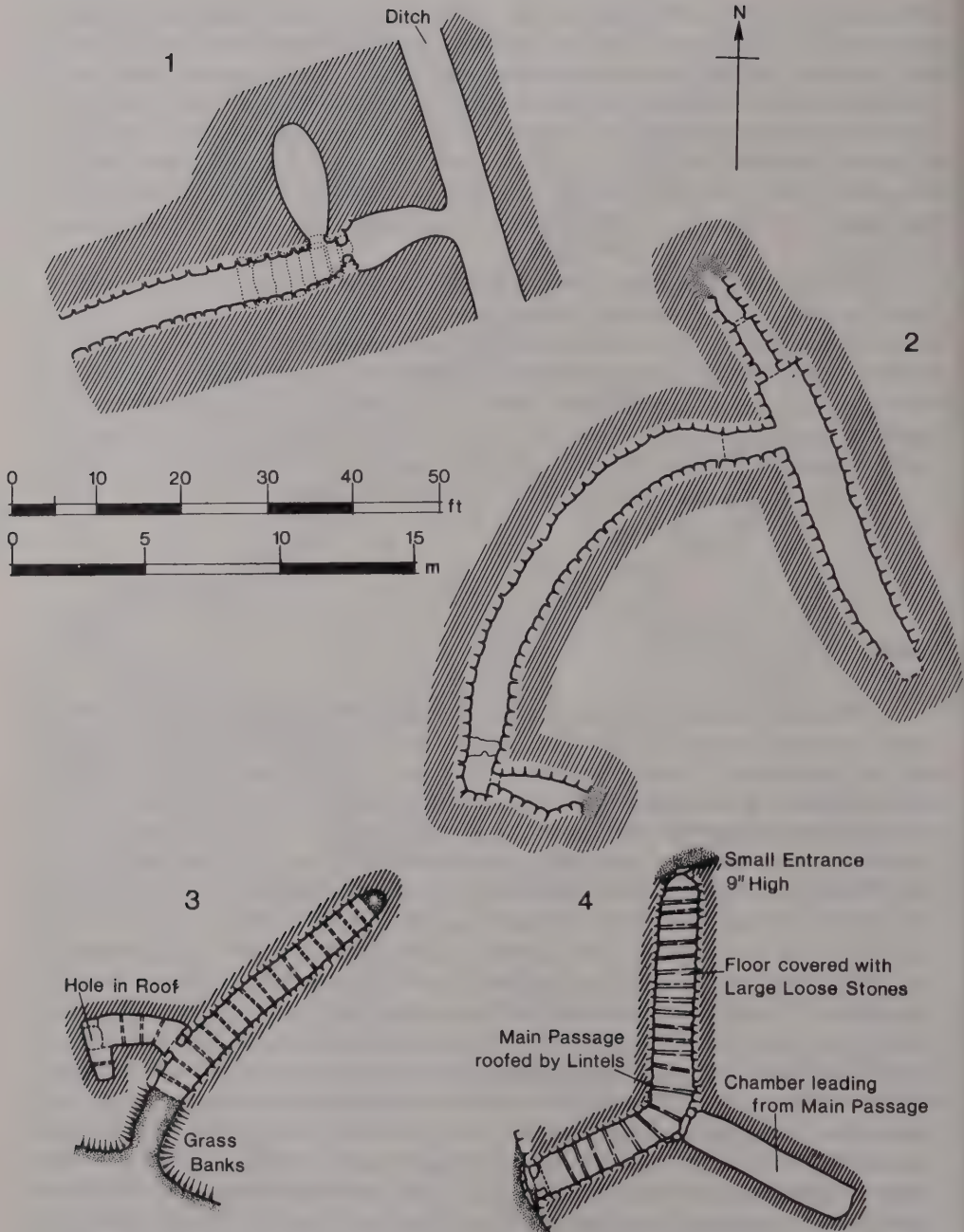


Fig. 2 Plans of Cornish fogous: 1, Treveneague; 2, Halligey (Crown copyright); 3, Boleigh; 4, Pendeen Vau.



**Boleigh** (Fig. 2, 3)

An embanked enclosure, now destroyed, is known to have existed at this site. The fogou which was set within it is mentioned by Dr William Borlase and other antiquaries. The surviving underground structure is built in a trench and consists of a main passage and a subsidiary one. The *main passage* is 6 feet 6 inches (2 m) high (maximum), 36 feet (11 m) long and 4 feet 10 inches (1.47 m) wide at the entrance. It narrows to a curved end at the north-east which is thought to have been intended as an opening to the exterior but was never finished. A carved figure, interpreted as a Romano-celtic deity, is faintly visible on the western orthostat which supports the entrance lintel. Excavations by Mrs Clark (1961: 50–63) have shown that the *subsidiary passage* ('creep') running west and then south is in two sections at right angles to each other: the first measures 12 feet 8 inches (3.9 m) and connects with the second which is 4 feet 11 inches (1.5 m) long. This 'creep' rises steeply from the floor of the main passage and terminates in a blocked doorway at the end of the second chamber. Pottery described as 'La Tène B' was discovered in undisturbed positions above the floor during excavations. Two vents in the roof are thought to relate to a later occupation of the fogou, probably during the Civil War or for storing contraband.

The carving at the entrance, and the evidence from the 'creep' lend support to the theory which is discussed in more detail at the end of this paper: that some fogous may have had more than purely utilitarian functions.

**Halligey near Trelowarren** (Fig. 2, 2)

This interesting and complex fogou does not appear to have attracted the notice of the Cornish antiquaries until the beginning of the 19th century. Thereafter several accounts and illustrations of the structure were published, including that by Blight (1885). Repairs were carried out during the 19th century and the monument still survives in a reasonable condition. Fig. 2, 2 is based on a recent survey of the fogou prior to its being taken into guardianship by the Department of the Environment. It lies within a large fortified enclosure and is itself partly concealed beneath a smaller rectangular enclosure. The layout of passages and chamber in this fogou is more elaborate than any other known Cornish fogou. It consists of: a *main, curving passage*, 4 feet (1.2 m) wide and 6 feet (1.8 m) high, oriented north-east/south-west, and described by Hencken as 'no less than 54 feet long', though as Fig. 2, 2 shows, it is a lot longer. The passage terminated against the natural rock at its south-west end (see Carn Euny below) with a short 'creep' passage running off to the south for an unknown distance just before this end. A ledge of rock left across the main passage near this 'creep' has been interpreted as a 'stumbling block'. At the north-east end the roof is stepped down to give a height of only 4 feet (1.2 m). Here, a well

constructed doorway, 3 feet (91 cm) high and 2 feet 3 inches (68 cm) wide, leads into a *straight passage* which runs north-south and measures 28 feet (8.5 m) long, 5 feet 6 inches (1.67 m) wide and 6 feet (1.8 m) high (Blight's measurements). A well-built doorway in its north end leads through to two further, connected passages of roughly equal length, becoming progressively narrower and lower until finally opening into the ditch surrounding the smaller enclosure. Certain features of construction link this fogou with Carn Euny, Pendeen and Bosporthennis.

### **Treveneague** (Fig. 2, 1)

This fogou, accounts of which are of considerable interest, has proved impossible to re-locate in recent years and only the earlier descriptions survive. It lay within a sub-rectangular enclosure known as Treveneague Beacon above the village of Treveneague in the parish of St Hilary. This enclosure has been described by many as a 'fort' but the account of both fogou and enclosure by J. T. Blight (1867) contest this. (Nowadays the evidence of size, shape and character of the ditch suggests that the site belonged to the class of enclosed settlement known in Cornwall as a round.) Blight pointed out that the enclosure, which measured some 200 feet (60 m) across, did not surround the summit of the hill but lay just below it and was indeed overlooked by higher ground. From this he drew the implication that it was not intended as a fortified site. Although the enclosure ditch was destroyed by a quarry on the north, there appeared to have been an entrance on the north-west since the western arm of the ditch stopped abruptly some 20 feet (6 m) before the quarry edge.

The fogou itself opened into the enclosure ditch on the east and consisted of a passage c. 34 feet (10 m) long, aligned north-east/south-west. It measured 4 feet (1.2 m) wide at the base, 3 feet (91 cm) at the top and 4 feet 9 inches (1.4 m) high, decreasing to 2 feet 8 inches (81 cm) at the west end (Blight's original measurements). The construction was of the usual dry-stone walling with large granite capstones, surviving intact for 12 feet 6 inches (3.8 m) in the eastern part of the passage. A doorway led off into a chamber at right angles to the main passage just before the passage ended in a similar doorway.

Both these openings were of the usual Iron Age type with single uprights supporting a lintel. The side chamber measured 15 feet (4.6 m) long, 6 feet (1.8 m) wide (maximum), cut into the natural 'clay' with a vaulted roof 4 feet (1.2 m) high (maximum) and invites comparison with the chamber cut into the natural sub-soil at Pendeen. Unfortunately, since no modern survey of Treveneague is possible owing to the apparent 'loss' of the site, Blight's description cannot be verified.

Beyond the doorway at the east of the main passage, Blight noted that an entrance passage cut through the natural subsoil of 'hard clay' opened into the enclosure ditch, which was 10–12 feet (3–3.6 m) wide and 9 feet (2.7 m) deep. It would appear that this passage was unroofed and represented an extension of the

trench dug for the stone-built fogou. The ditch was already filled in by Blight's time, but sections were cut across it at intervals to establish the plan of the enclosure, which is now recognised as a 'round'.

Finds from the site include 'Glastonbury' pottery (Hencken, 1932: 143–5) which was found both in the fogou itself and in the enclosure ditch near the quarry, where it appeared to be associated with a fine granite mortar.

### **Porthmeor** (Fig. 3, 5)

A very ruined structure was identified as an above-ground fogou during the excavations by F. C. Hirst (1937) in the Iron Age village of Porthmeor between 1933 and 1935. It consists of a curving passage (19 feet (5.8 m) long, 6 feet 6 inches (2 m) wide), with corbelled walls originally covered with capstones but now roofless. Stone-covered drains run down part of the fogou passage and out through the wall to the west. This outer wall of the fogou is 8 feet (2.4 m) thick and is concentric with the inner wall. The original length of the fogou is unknown, since much rebuilding and demolition has taken place, and it is not known if any subsidiary passages existed.

The association of such a structure with a surviving village of Courtyard House type is of particular interest, and Mrs Clark (1961: 71) expressed a view that the building of the Courtyard House may have blocked off the original end of the fogou on the north-east. This assumes that the fogou pre-dated the Courtyard House phase at Porthmeor. This is especially interesting, in view of the fact that excavation at Carn Euny has shown the Courtyard House phase to be clearly later than the fogou, while early stamp decorated pottery occurs at both these sites.

### **Lower Boscaswell** (Fig. 3, 6)

Apart from the excavations at Porthmeor mentioned above, this was the first Cornish fogou to be scientifically excavated (Clark, Ford and Thomas, 1957: 213–19). Although only a small part of the structure was known and was available for excavation, the results were of great interest, and helped to confirm the pre-Roman Iron Age dating for these monuments in the county. The site lies half a mile (800 m) from the north coast, not far from Pendeen, and has been known since the 19th century.

The surviving portion of the main passage runs approximately east-west under a mount and carries two capstones. An unroofed section continues eastward into an oval walled garden, believed to be the remains of an Iron Age enclosure of Courtyard House type. The present access to the passage is under the western capstone, which has slipped, probably due to blasting, giving a low entrance 5 feet (1.5 m) wide from a farm lane. A further capstone lies in this lane, while beyond – in line with the



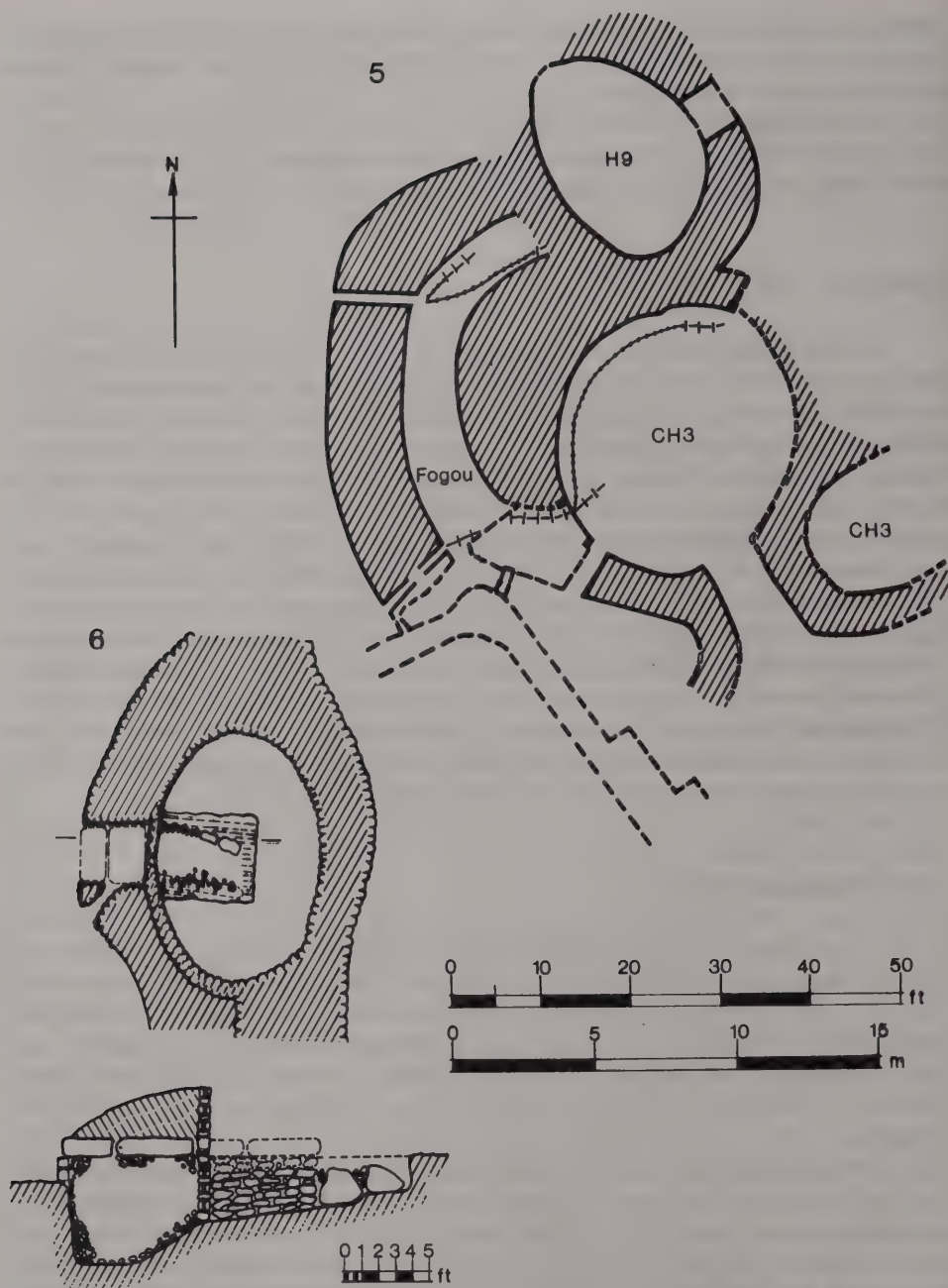


Fig. 3 Cornish fogous: 5, Porthmeor; 6, Lower Boscaswell.

entrance just described – a massive field wall 12 feet (3.6 m) wide extends westward and is believed to contain the remainder of the fogou passage and possibly the original entrance on its north side. This is given weight by the evidence from Pendeen nearby, where the fogou described above and other Iron Age features are known to be concealed beneath massive walls.

The main passage, built of dry-stone walling and curving slightly, runs for approximately 8 feet (2.4 m) from the ruined west end to a point where a modern wall (Fig. 3, 6 – section) blocks off the passage under the mound from its extension into the oval enclosure on the east. From the south wall of the passage a ‘creep’ runs for a distance of 4 feet 10 inches (3.47 m), sloping up gently to the south-west, with openings of well constructed jambs and lintels at both the inner and outer ends. As the section in Fig. 3 illustrates, the passage floor rises up sharply from its maximum depth (presumably the level of the main passage throughout its length) to the point where the modern wall blocks it. The floor (of natural rab) continues to rise eastward – but more gradually – throughout its total length of 10 feet 9 inches (3.27 m) within the enclosure. The north wall of the passage, which was in almost perfect condition throughout its excavated length, shows a change of build in the last few feet. Instead of horizontal courses which could have been built up to support capstones, the two large orthostats with smaller stones between which occur here are believed to represent the final unroofed section of the passage opening into the enclosure. Unfortunately the south wall of the passage was totally ruinous and it was therefore impossible to confirm this theory, but an interesting analogy exists with the sloping east entrance at Carn Euny, described below.

Eight sherds of pottery attributable to the Iron Age were found in the excavation and one, with slashed neck cordon, (Clark, Ford and Thomas, 1957: 217) falls within the group of decorated pottery known from other pre-Roman Iron Age sites including Carn Euny where it belongs to Phase IIA of the pottery sequence (Elsdon, 1978).

### **Bosporthenis (Fig. 4, 7)**

The above-ground structure known as the ‘Beehive Hut’ at Bosporthenis, near Zennor, has been known since the mid 19th century (Blight, 1865: 139–142) but was considered by most antiquaries, with a few notable exceptions, to be a habitation comparable with the beehive huts of Ireland rather than part of a fogou. It consists of a circular room, 14 feet 6 inches (4.4 m) in diameter, with corbelled walls surviving to a height of about 5–6 feet (1.5–1.8 m), linked to a rectangular room 6 feet 9 inches (2 m) wide and 12 feet (3.6 m) long by an opening of upright jambs and lintel of Iron Age type.

Comparison between this building and the round chamber and entrance passage at Carn Euny fogou had already been made by Borlase and Edmonds in the

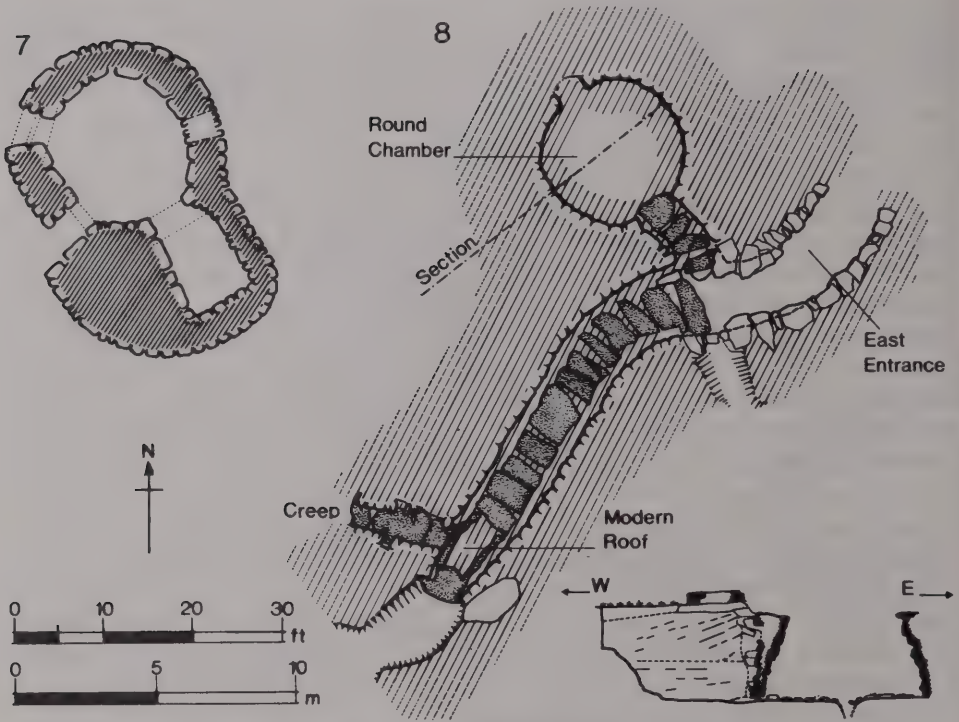


Fig. 4 Cornish fogous: 7, Bosporthennis; 8, Carn Euny.

mid-19th century, during their work on this latter site, but these comments went unnoticed. It was not until the 1930s that a detailed comparison between the two structures, the one above ground, the other below, was made by F. C. Hirst (1934) who presented a strong case for considering the Bosporthennis hut as part of a fogou. Hirst's case was strengthened by the accounts of 'early habitations' which stood near the hut, but which were demolished sometime before the 1839 Tithe Survey by a farmer who wanted building stone for enclosure walls. Hirst suggested that the hut survived because it was needed as a sheep-shelter. The modifications made to the original structure as a result of this include modern openings made in the south-west and south walls of the round room and a window inserted into the rectangular room. The small opening on the north-west is believed to be part of the original structure and compares with the recess opposite the doorway into the Round Chamber at Carn Euny. At Bosporthennis, however, this opening runs right through the hut wall, though formerly sealed by a boulder (Clark, 1961: 146). If, as is believed, the structure was originally covered by a mound (traces of which survive on the south-west) this opening would have been 'blind' in the same way as the recess in the



underground chamber at Carn Euny. The rectangular room also has features in common with the entrance passage to the round chamber at Carn Euny, especially when it is remembered that the south wall at Bosporthennis is known to be a recent insertion.

All writers, including Hirst, have assumed that both the 'Beehive Hut' and Carn Euny round chamber were roofed with corbelled domes. Excavation at the latter contests this view strongly, for reasons given below. The section of the Bosporthennis hut published by Hirst (1934: Fig. 2), with a hypothetical capstone sealing the dome, is considered by this writer to be extremely misleading. Indeed, the original plan and sections made by Lukis (1885: Plate 34) would seem to be more accurate in this respect, although discarded by Hirst.

Despite the controversial interpretation of the roofing, there do appear to be enough similarities between the two structures to concede the view that they must be related, especially since fogous constructed above ground are commoner than was originally thought (e.g. Pendeen, Porthmeor).

## CURRENT EXCAVATIONS

The remainder of this paper deals with excavations carried out on behalf of the Department of the Environment's Ancient Monuments Directorate between 1964 and 1972 at the Iron Age village of Carn Euny. During the course of excavations the fogou was carefully examined and surveyed, and a number of interesting points have emerged concerning both the structure and its relationship to the settlement. Interim report on the work appeared in *Cornish Archaeology* between 1965 and 1970 and the final report, which includes a full analysis of the pottery by Sheila Elsdon, has recently been published (Christie, 1978).

### **Carn Euny** (Fig. 5)

The prehistoric village and fogou of Carn Euny (formerly known as Chapel Euny) are situated on the granite uplands of the Land's End peninsula on the southern flank of a hill crowned with the circular Iron Age hill fort of *Caer Brân*. The fogou, which roughly bisects the village from east to west, is first mentioned in the early 19th century (Edmonds, 1849) and appears to have been discovered by miners prospecting for tin. Between 1863 and 1867 it was excavated by the Cornish antiquary, William Copeland Borlase (1868–9) and some further work was carried out during the 1920s on two hut circles (Hencken, 1932: 139). The site was taken into guardianship by the Ancient Monuments Inspectorate of the former Ministry of Works in 1953. Since then the fogou, which was in need of conservation, has been

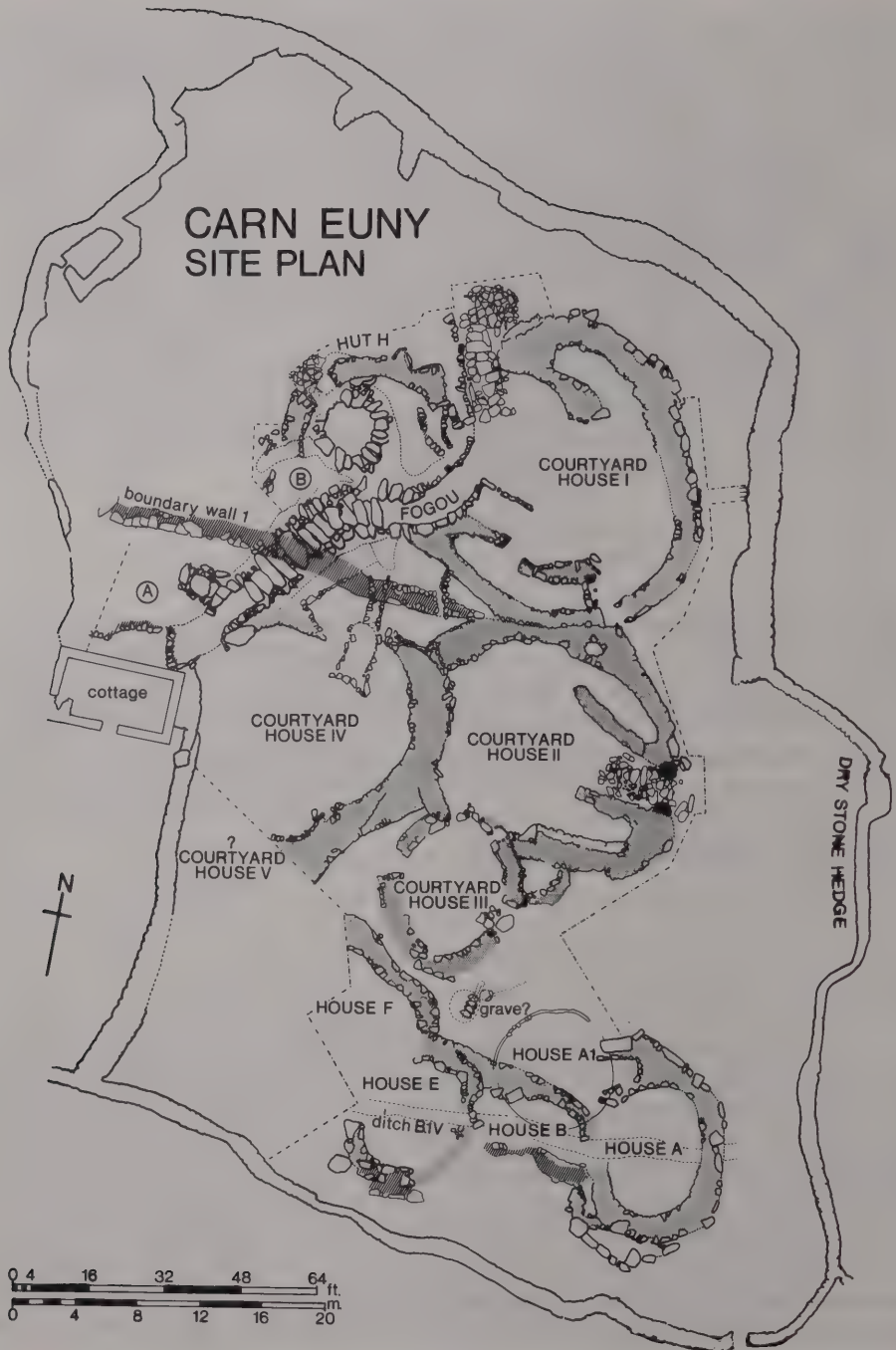


Fig. 5 Carn Euny. Site plan showing position of fogou within settlement (courtesy Prehistoric Society).

thoroughly re-examined and most of the southern and eastern part of the settlement excavated. The present boundary wall, although of some antiquity, does not contain the whole village, which is believed to extend further west and south – while lynchets are still visible in the fields on the north and east.

Mesolithic, Neolithic and Bronze Age finds, both from the excavation and from neighbouring fields, point to earlier prehistoric activity in the area. The first traces of settlement on the site itself, however, consist of structures believed to have been built largely of timber and turf which date from the earlier part of the early Iron Age in south-west Britain. A series of radiocarbon determinations gives a maximum range of time from the 5th century BC to the 3rd century AD – an occupation which appears to have been more or less continuous over some 600 years. Conclusive dating for the fogou is still lacking, though the primary structure is thought to go back to the 5th century BC or even earlier. Pollen from the land surface contemporary with the fogou shows a far more wooded environment than that existing in later Iron Age times and the uplands today are of course entirely denuded of trees.

### **Carn Euny Fogou (Fig. 4, 3)**

The structure consists of the following elements:

- (1) a round chamber and integral entrance passage;
- (2) a long passage and integral side passage ('creep');
- (3) a sloping east entrance.

Excavation has shown that these three groups represent three main building phases. Of these the round chamber is clearly the earliest, and the rearrangement of the east end of the long passage is the last.

*Round Chamber.* (Plate I) This measures 15 feet (4.5 m) across the base and 10–11 feet (3–3.3 m) across the top of the surviving walls, which stand 8 feet (2.4 m) high. It was built within a pit cut into the rab. The corbelling technique, both here and in the Long Passage, utilised increasingly large and long stones for each rising course, so that the back of the stones form a near-vertical face while the upper courses overlap inwards – in the case of the round chamber to the extent of about 2 feet 6 inches (76 cm). But whereas the walls of the long passage are roofed with large capstones and thereby consolidated, those of the round chamber are potentially free-standing since they form interlocking rings (Plate IV). The top course consists of a continuous ring of stones of roughly equal width, but varying length, 'trigged' carefully into position with small wedging stones to form a level surface all the way round. Gaps in the ring are accounted for in one case at least by a corbel stone found on the floor of the chamber. Others would no doubt have been removed during the 19th century clearance. There was no trace of a further course of stones, and it is not thought that the chamber was ever completely closed by a corbelled roof. Support for this theory is provided by the excavation of what is believed to have been a *construction trench* cut into the rab from the west. This narrow, steeply sloping trench (Plate III) led down



into the pit containing the round structure and the building of the stone lining effectively sealed it from within, so that no indication of its existence is visible from inside the chamber. The trench was fully excavated to explore the back of the chamber walling: this was found to be quite free-standing, corbelled inwards, with progressively larger stones toward the top, as mentioned above. Clean yellow rab packed in between the stones was clearly used as 'cement' both here, in the long passage and in the construction of the 'creep'. (In repair work carried out during excavation of the latter, clean rab mixed with a little water was used and found to be most effective!) A small shallow gully cut into the rab at the base of the trench ran out into the round chamber under the basal wall stones, which were surprisingly small at this point. The fill of the trench, which consisted of mixed rab and soil with charcoal, lay horizontally in the lower half but sloped up against the back of the stone structure in the upper half. On the surface of the lower, horizontal fill a hard iron pan had formed, suggesting a pause in the infilling of the trench, possibly associated with tramping.

In view of the existence of the entrance passage (see below) which must have been dug out at the same time as the pit for the Round Chamber, and would have provided access for men and building materials, it is hard to understand the need for another building trench – if indeed that was its purpose – unless there was some change in plan during the construction of the Round Chamber.

The *roofing* of the Round Chamber presents a problem: it has long been assumed that the circular structure at Carn Euny, as at Bosporthennis, would have been completely enclosed by a corbelled dome of the beehive type. At both these sites it has been calculated that the completed domes would attain a height of 7–8 feet (2.1–2.4 m) and would probably have been sealed by a flat slab (Hirst, 1934: Fig. 2). The back of the structure, as revealed by the construction trench described above, suggests however that the chamber was *not* completely closed. Structurally it would be well-nigh impossible in view of the size of blocks already existing in the surviving upper course, which is already 8 feet (2.4 m) above the floor of the chamber. This suggests that it would either have been open to the sky, or roofed with timber and thatch (or turf) around a central post. Some support for this timber roof theory was found on excavation within the Round Chamber. The removal of fallen stones, including the corbel stone mentioned above, and accumulated deposits revealed the original Iron Age paving, much disturbed in places, in the centre of which was an oval pit with a large block of natural granite at the base. It was not possible to prove whether this pit, in its present form (shown filled with water in Plate I), represents a genuine Iron Age feature, but there is a strong possibility that some kind of pit did exist originally at this point, and this could have supported a substantial roof post.

No description of the Round Chamber at Carn Euny would be complete without the mention of the *recess* built into the wall opposite the entrance and shown in Plate I. This measures 3 feet (91 cm) wide, nearly 3 feet high and 2 feet (60 cm) deep. Although it is carefully built, with uprights and lintel, there is no stone backing,



Plate I Carn Euny Fogou: Round Chamber 2 years after excavation. Note recess and paving. (Photo John Lingwood)

and it thus gives direct onto the natural rab. It is thought, however, that some sort of stone lining must have been present originally. This recess compares with an opening of similar size at Bosphorthennis, mentioned above. It would have been shallow for a cupboard, and some non-utilitarian function is presumed for this curious feature.

The short *Entrance Passage* leading from the Long Passage into the Round Chamber (Plate V, left) measures 7 feet (2.1 m) long 4 feet (1.2 m) wide and is roofed with capstones set on low walls, giving a maximum height of 4 feet 6 inches (1.35 m). This is in marked contrast to the Long Passage itself, where it is possible to stand upright in comfort.

Examination of the doorway into the Round Chamber and excavation behind the Entrance Passage on both sides have shown that these two parts of the structure are contemporary and *earlier* than the Long Passage.

A drain covered with flat stones and containing early Iron Age pottery was cut into the rab floor near the west wall of the Entrance Passage, and this then joined the main drain running down the Long Passage. It is possible that this Entrance Passage was originally longer and provided access to the outside before being cut by the main



*Plate II* Carn Euny Fogou: view of Long Passage from south-west. (Photo: John Lingwood).

passage, since the remains of a shallow trench was discovered beyond the south wall of the latter (Christie, 1978: Trench 2).

*Long Passage.* (Plate II) This measures 6 feet 6 inches (1.98 m) wide, 6 feet (1.82 m) high throughout most of its length and 66 feet (20 m) long including the unroofed portion, but excluding the sloping East Entrance, which added a further 10 feet (3 m) approximately. The roof of granite capstones (Plate VI) which originally covered the passage has been repaired and fallen capstones replaced where possible, so that it is now continuous over most of its length, apart from the eastern section. Excavation has shown that the passage roof would have protruded slightly above ground level when built, and evidence for a slight mound was also found, revetted on the south side where the ground level is lower by vertically placed stones.

According to Borlase's account (1868: 167) the passage had been filled with earth right up to the roof from the entrance passage to the Round Chamber down to the southwest end. The rest of the passage, the East Entrance and the Round Chamber, although choked with fallen stones, do not appear to have been deliberately filled prior to the 19th century.





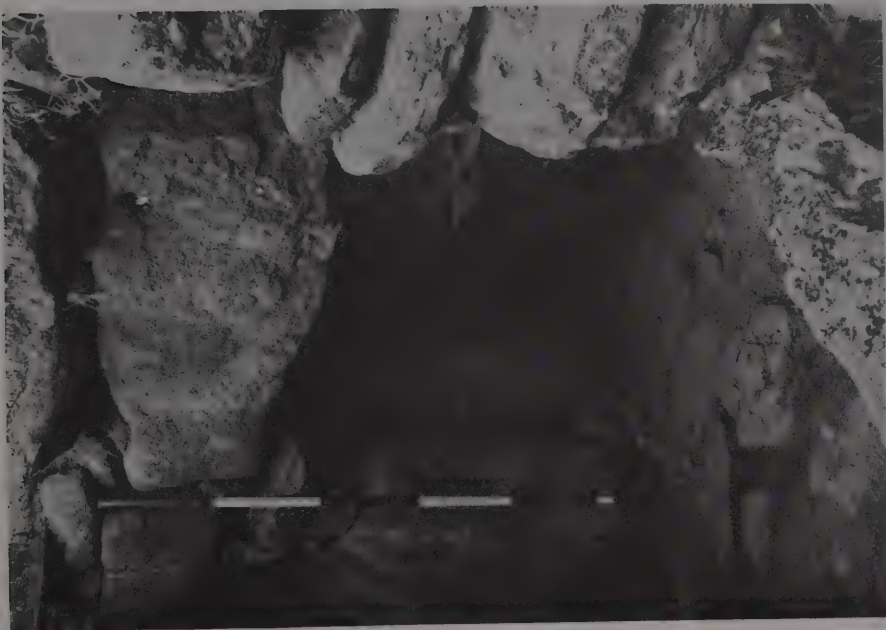
*Plate III* Carn Euny Fogou: Round Chamber and Construction trench. Near-vertical view from west.  
(Photo: John Lingwood).



*Plate IV* Carn Euny Fogou: top of Round Chamber during excavation, looking north to site boundary.

The small side passage, 12 feet (2.6 m) long and 2–3 feet (60–91 cm) wide was thoroughly examined both inside and out. It was found to be part of the same constructional phase as the Long Passage, from the floor of which it slopes steeply up, (Plate V, right) with a maximum height of 3 feet (91 cm) (hence the term ‘creep’). Borlase mentions it being blocked with a long stone set vertically, which recalls the blocking of the ‘creep’ at Boleigh. He also found it entirely filled up with earth.

The southwest end of the Long Passage emerged into a deep rab-cut trench believed to be a later, probably post-Iron Age feature, into which the last roofing



*Plate V* Carn Euny Fogou: *left* Entrance to Round Chamber. *right* Entrance to 'creep' from Long Passage.





*Plate VI* Carn Euny Fogou: section across Long Passage showing capstones and top of walling, before consolidation, from north-west.

stone had fallen – no doubt as a result of blasting by miners. Since the passage roof at this point is level with the original ground surface and the walling terminates in a vertical face, either the passage ended up against the natural rab, or access to the surface was provided by a sloping entrance which was completely destroyed by the later disturbance. On the evidence available, it seems most likely that the passage was originally closed at this end. (The decrease in roof height is also seen at Halligey and at the west end of Treveneague.)

The curving north-eastern portion of the Long Passage has a flat floor for several feet after its junction with the entrance to the passage leading into the Round Chamber, and then slopes uphill, forming the East Entrance described below. It is thought that roofing stones would have covered the flat part only, and that the final, sloping portion of the passage opening into Courtyard House I would have been unroofed, in the manner proposed for Lower Boscaswell, already described. In addition, it is suggested that the original roofed structure would have terminated at the point where the walls cease to be corbelled and the floor starts to rise uphill. The end of the passage could, in this case, have been up against the natural rab here too, as in the south-west part. If this could be proved conclusively then the only access to the entire structure would have been down the 'creep'.

*East Entrance* – this final, sloping portion of the Long Passage is lined with vertical walling, in contrast to the corbelled walling elsewhere in the structure. Two uprights on either side mark the point where the entrance reaches ground level and opens into a Courtyard House enclosure. A fine paved way provides access from the north into this enclosure, but it also curves round and appears to provide access to the Fogou as well. At a later date the entrance to the Fogou was carefully blocked between the uprights by two orthostats set side by side and trigged into position with a massive boulder behind them on the north (Plate VII). Unfortunately, it proved impossible to date this blocking of the East Entrance, just as it was impossible to tell when the Long Passage was filled up with earth. It seems probable that the two were not contemporary – the Round Chamber and eastern part of the Long Passage continuing in use longest – but that both were certainly pre-19th century.

### *Dating*

The construction of the east entrance just described undoubtedly belongs to Phase III of the settlement (Christie, 1978). The stone-built house enclosures which form the bulk of the standing remains of the village can also be dated to this phase, as a result of the study of the pottery (Elsdon, 1978). Earlier Iron Age pottery in the general 'Glastonbury' tradition and well known from Cornwall from sites such as Castle Dore was discovered within the Fogou and elsewhere on the site where it is associated with phase II of the settlement.

An important deposit of pottery associated with charcoal from the floor of the



Long Passage bears characteristic decoration of a kind so far only found in any quantity at this site and has therefore been designated 'Carn Euny ware' (Elsdon, 1978: 397, Po. 6). It was sealed by earth and paving stones associated with the new entrance at the north-east end and the charcoal has provided a radiocarbon date of  $130 \pm 80$  bc (HAR 334). This date should relate to analogous pottery from Phase II at Carn Euny and to pottery from other sites in the county, thus fixing a date for the use, if not the actual construction, of most Cornish fogous.

An earlier date, in the 5th century BC, was also obtained for the site. This came from a trench containing charcoal and stamp decorated pottery beneath the paved entrance on the north of Courtyard House I, mentioned above. A sherd of typologically similar pot was found beneath the undisturbed portion of paving within





*Plate VII* Carn Euny Fogou: East Entrance, *left* with blocking in position. *right* with blocking removed.

the Round Chamber, and is tentatively linked to the construction of this part of the monument. It must be stressed, however, that one sherd cannot be considered to date the structure with any certainty, though the primary position of the Round Chamber in the building sequence has already been established.

## **Discussion**

It will be noted from the plans and brief descriptions of Cornish fogous contained in this paper (and the same applies to others not described) that despite overall structural similarity and many detailed analogies, each monument has its

unique qualities. Like all man-made structures, certainly in prehistory, no two are quite alike. The main curving passage at Halligey and the passages at Pendeen and Treveneague can be compared structurally with the long passage at Carn Euny, though the dimensions vary and so do the subsidiary or 'creep' passages. Other structural details can be compared with those at Carn Euny and mention has already been made of the analogies between the above-ground structure at Bosporthennis and the Carn Euny round chamber. Granitic decorated pottery from Treveneague fogou is similar to sherds from Carn Euny (Elsdon, 1978: 397, Po. 5) but on the whole there is little in the way of finds from earlier excavations of Cornish fogous which can be compared with the material from Carn Euny, though some sites would no doubt repay re-examination.

The functions of souterrains still eludes us, if indeed there ever was one overall function applicable to the whole group of monuments under this heading, which seems unlikely. Many theories have been propounded, from their use as hide-outs in time of trouble, to cellars for storage of goods and live-stock. This latter view is favoured by Thomas (1972) while some connection with sheep husbandry in upland regions has recently been suggested by Brothwell (1977: 187) as one possible function for certain (though not all) types of souterrain.

There is no evidence from the Cornish fogous of domestic occupation in the manner of some Breton examples, nor of burial use. This may be partly due, however, to some having been open since the Iron Age and others cleared out in antiquity. Moreover, the soil conditions in the Land's End peninsula, where the majority are situated, favour the survival of little except pottery.

The recent excavation of the Carn Euny Fogou has not provided the answer to the souterrain problem. However, certain interesting facts have emerged, the most notable being the establishment of this as a multi-period structure, with several building phases. The dating of these phases has been suggested. This raises the question of the relationship of the fogou to the settlement, which in turn raises the problem of *function*. If they are seen as cellars, then the evidence at Carn Euny for a long passage, closed at both ends originally and accessible only through the 'creep', makes little sense for such a practical use. It is suggested that other Cornish fogous (Lower Boscawell, Halligey and others) may also have had closed passages originally and only been opened up when other structures were built in their immediate vicinity at a later date. Moreover, the association at Carn Euny of such a 'secret' passage with an unroofed pit of earlier date suggests that here at least a non-utilitarian function may be admitted. It is interesting to note that in the most recent discussion of souterrains in Scotland the possibility of their having some religious connection is re-voiced (Brothwell, 1977: 188-9). Whatever the original Iron Age function of the fogou, a hint of later use of the round chamber at Carn Euny is provided by a description of the Lovers' Cave in the 'Tristramssage' – a 12th century German Romance set in Cornwall – and a strong case has been made for identifying this with the site at Carn Euny (Harris, 1977: 317-327).

Around 100 BC certain new cultural elements appeared in the southwest of Britain (Thomas, 1966), some of which may have been introduced by Venetic traders from Brittany. Professor Thomas has suggested that these new ideas included Courtyard Houses, Cordoned Ware pottery and also souterrains. It is clear from recent work, however, that the souterrain 'fashion' preceded the Courtyard House-Cordoned Ware phase as Professor Thomas himself pointed out in a later paper (1972), and can be associated with pottery dated to the 3rd–2nd century BC both at Carn Euny and at other fogou sites in the country. Moreover, this contact may have begun even earlier, in view of the 5th century date associated with stamp decorated pottery from Carn Euny and the dates of comparable age from Breton souterrains.

Despite the connections between Cornwall and Brittany in the early Iron Age, seen particularly in the pottery, Cornish souterrains are architecturally more akin to those of Scotland and Ireland. The main stone-built passages, often gently curved, find analogies in Scotland, particularly in Angus (Wainwright, 1953) while a recently discovered souterrain in Perthshire (Watkins, 1977 and 1979) appears to have several features resembling Carn Euny and other Cornish examples. The building of souterrains by certain groups in widely separated areas must surely have been linked with some definite cultural tradition which it is hard to isolate today.

The earliest settlers at Carn Euny may be presumed to have built the round chamber, *without* the long passage, during the 5th century BC. This appears to be a unique monument in southern Britain. If, as seems possible, it was entered by a gently sloping passage from the south-east (the entrance passage and its extension, later cut through by the long passage), this could have served equally as a semi-underground house, for the living (or the dead), all trace of which would have been removed by the building of the long passage in the 3rd–2nd century BC and the use to which it was then put.

Since they appear to belong to two separate traditions, it is perhaps important to disassociate these two structures until other examples emerge where a souterrain passage can be demonstrably associated with a circular chamber of earlier date. In Cornwall itself, with the exception of the Bosporthennis structure, no other round chambers are known to be associated with fogous, though circular chambers, usually rather smaller, are known from other regions. A circular chamber slightly larger than Carn Euny has recently been described from Ireland (Twohig, 1974) and 'beehive' chambers are also known from Scotland (Wainwright, 1953).

In his recent discussion of the Orkney site, Mr Brothwell (1977) has pointed out that a 'heterogenous mass of structures' have been labelled souterrains and earth houses, and warns against the use of generalised terms of this kind, preferring a more scientific description based on morphology, namely 'mycoform' structures. The Cornish souterrains might be eligible for this description, as a glance at Fig. 2 shows, but plans of souterrains published by Giot (1960) and others in the *Annales de Bretagne* in recent years (volume 67 onwards) clearly demonstrate that the Breton



forms are even more mycotic (fungal). Perhaps this is the main link between them? In the absence of up-to-date detailed examination of other existing sites, comparisons are of limited value. Useful information has been gained by excavation at Carn Euny, concerning both the building sequence and the relationship of the fogou and settlement. But much more research is needed in Cornwall and elsewhere before any progress can be made toward solving the riddle of these puzzling monuments.

## Appendix

The fogou sites listed below are taken from Clark (1961) and reflect the state of knowledge at that time. In the later survey by Russell (1971) there are 35 entries under fogous for the West Penwith district alone, although many of them exist only as place names or traditions. Mrs Clark's original list is still valid, therefore, especially as far as the surviving fogous are concerned, all but two of which have been visited by the writer in recent years. The site in north Cornwall has been excluded, as it is no longer considered to be a fogou.

### *Surviving Fogous*

Boleigh (Bolleit), St Buryan Parish; Lower Boscaswell, St Just Parish; Carn (Chapel) Euny, Sancreed Parish; Chysauster, Gulval Parish; Helligey, Treloar Warren, Mawgan-in-Meneag Parish; Pendeen Vau, St Just Parish; Porthmeor, Zennor Parish; Trewardreva, Constantine Parish; Bosporthennis 'hut', Zennor Parish.

### *Destroyed Fogous*

Higher Bodinar, Sancreed Parish; Bosigran, Zennor Parish; Castallack, Paul Parish; Chygwidden Vean, Sancreed Parish; Foage, Zennor Parish; Hellesvean, St Ives Parish; Leah, St Buryan Parish; Tregenna, St Ives Parish; Trevean, Morvah Parish; Trewern, Madron Parish; Treveneague, St Hilary Parish.

## Abstract

Cornish souterrains, known locally as 'fogous', are concentrated in the south-west of the county and few have been scientifically excavated. Seven of the most important fogous are briefly described, and this is followed by a more detailed account of recent excavations at Carn Euny. Here work has shown that the fogou, which consists of a round chamber as well as a long passage, has several building phases. Facts and theories concerning construction are discussed, notably the roofing of the round chamber and the nature of the long passage. Decorated pottery associated with the long passage and with phase II of the surrounding settlement is dated to the 2nd century BC. Evidence is put forward for cultural contacts with

# CORNISH SOUTERRAINS IN THE LIGHT OF RECENT RESEARCH

Brittany, probably from the fifth century BC onward. Structurally, however, Cornish fogous are seen to be more akin to souterrains elsewhere in the British Isles. The possibility that some of them may originally have served as cult centres is considered.

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# Recent archaeological activities in Ibiza and Formentera

by CELIA TOPP, J. H. FERNANDEZ and L. PLANTALAMOR

## A: FORMENTERA

### I: Ca na Costa

Ca na Costa (Plate I), the first megalithic chamber tomb to be discovered in this Pitiussae sub-group of the Balearic archipelago, was excavated in February 1975 (Topp, Fernandez and Plantalamor, 1976: 139–174).

The aims of the second – and final – excavation at Ca na Costa in April 1977 were threefold:

- (1) To determine the area of the supposed platform of rough limestone paving around the chamber tomb.
- (2) To ascertain the nature of the stone mass 17 metres to the west of the surrounding area and that of the stones standing outside the radials of the eastern sector.
- (3) To excavate a possible megalithic cist beside the modern field wall 4 metres to the northeast of the chamber tomb.

It soon became evident that the paving around the monument did not constitute a platform (as had originally been surmised). The rough limestone paving referred to as a possible platform in the previous report is in reality a small forecourt beyond the passage entrance and also partly the remains of a third retaining wall (Fig. 1).

The forecourt (Plate II) measures 2.05 m by 1.30 m and projects 0.22 m outside the entrance. This forecourt, as symmetrical as the rest of Ca na Costa, is slightly higher than the passage whose level is that of the rock surface.

The only find in this area was a small amorphous flint fragment of tabular nature which was lying in the southeast sector of the forecourt (Fig. 2, no. 1).

The rest of the pavement around the monument provided a further surprise. It represents the remains of yet another (a third) retaining wall, similar in nature and purpose to the two inner ones. It is built directly onto the natural rock and in some places still retains two stone courses although, as is the case with the second wall and



*Plate I* Overall view of Ca na Costa from the west.

the radials, it is almost completely lacking on the South side (Plate III). This outermost wall consists of an exterior circle of large stones with a paving of smaller ones in the intervening space between it and the kerbstones of the radials. Its width varies between 1.10m and 0.52m. It is more akin to the first inner wall nearest the chamber than to the second wider one enclosing the radials.

The alignment and fallen stones 17 metres to the west of the original surrounding area proved to be a combination of natural rock formations and limestone blocks removed from the chamber tomb.

The tall stones standing outside the rear (or eastern) end of the chamber had evidently also been removed from the monument in recent years and used to build a shelter for domestic animals and outhouses. These stones have now been re-sited outside the perimeter of the surrounding area.

The putative cist beside the modern field wall to the North also proved to belong to present times. It most probably formed part of the farm complex just mentioned and had been used as a rubbish pit. It had been built with one whole and two broken half-radials taken from the megalith. The only finds of any import were two flints; these are of non-tabular nature and thus differ from the fragment found in the forecourt. They might well have been moved to their position within the pit along with the radials and the earth around them. One is a small pebble core from which flakes have been detached and the other is a notched borer made from similar shiny



Fig. 1 Plan of Ca na Costa.

brown flint (Fig. 2, nos. 2 and 3). These flints are the first ever to appear in excavations in these two islands and so constitute a find of major interest. It is naturally impossible to say anything about their place of origin: the pebble might be either a casual beach find or have been brought to the island intentionally. These three flints, allied to the total absence of metal on the site, serve to strengthen the probability that Ca na Costa belongs to an early, pre-metal period.

A further important find was made in the southeast sector of the surrounding area. In the course of uprooting a wild olive tree, similar to the one removed from the centre of the chamber during the 1975 excavation, a broken sandstone 'wristguard' or whetstone of the kind associated with beakers was unearthed (Fig. 2, no. 4). This fine particular specimen has a suspension hole and the remains of three other





*Plate II* The forecourt, passage and porthole entrance.

perforations lower down – all well-drilled from one side only. Parallels to this artefact are numerous around the Western Mediterranean and in its islands, as well as much further afield, in an early Bronze Age context. The one from Son Puig 15 (Mallorca), (Veny, 1968: Fig. 139, no. 5) appears very similar to that from Ca na Costa, despite the broken state of the latter. This could have been moved to its position when found during the agricultural activities of recent times (as the two flints from the rubbish pit) or broken and discarded at a very much more remote period.

A round sandstone hammerstone, flattened at both ends and showing marked signs of use (Fig. 2, no. 5) was found at the northeast sector of the surrounding area as also a seashell perforated for suspension, probably of ornamental purpose (Fig. 2, no. 6).

Apart from the above described objects the only other new finds from Ca na Costa were further sherds of similar nature and shapes to those found during the course of the former excavation (Fig. 3, nos. 1–5). One of these, from the northeast sector shows a repair-perforation (Fig. 3, no. 6).

Ca na Costa – though still not officially scheduled as an ancient monument – is at least now protected from vandalism by a stout palissade of metal posts and wire mesh.

# RECENT ARCHAEOLOGICAL ACTIVITIES IN IBIZA AND FORMENTERA

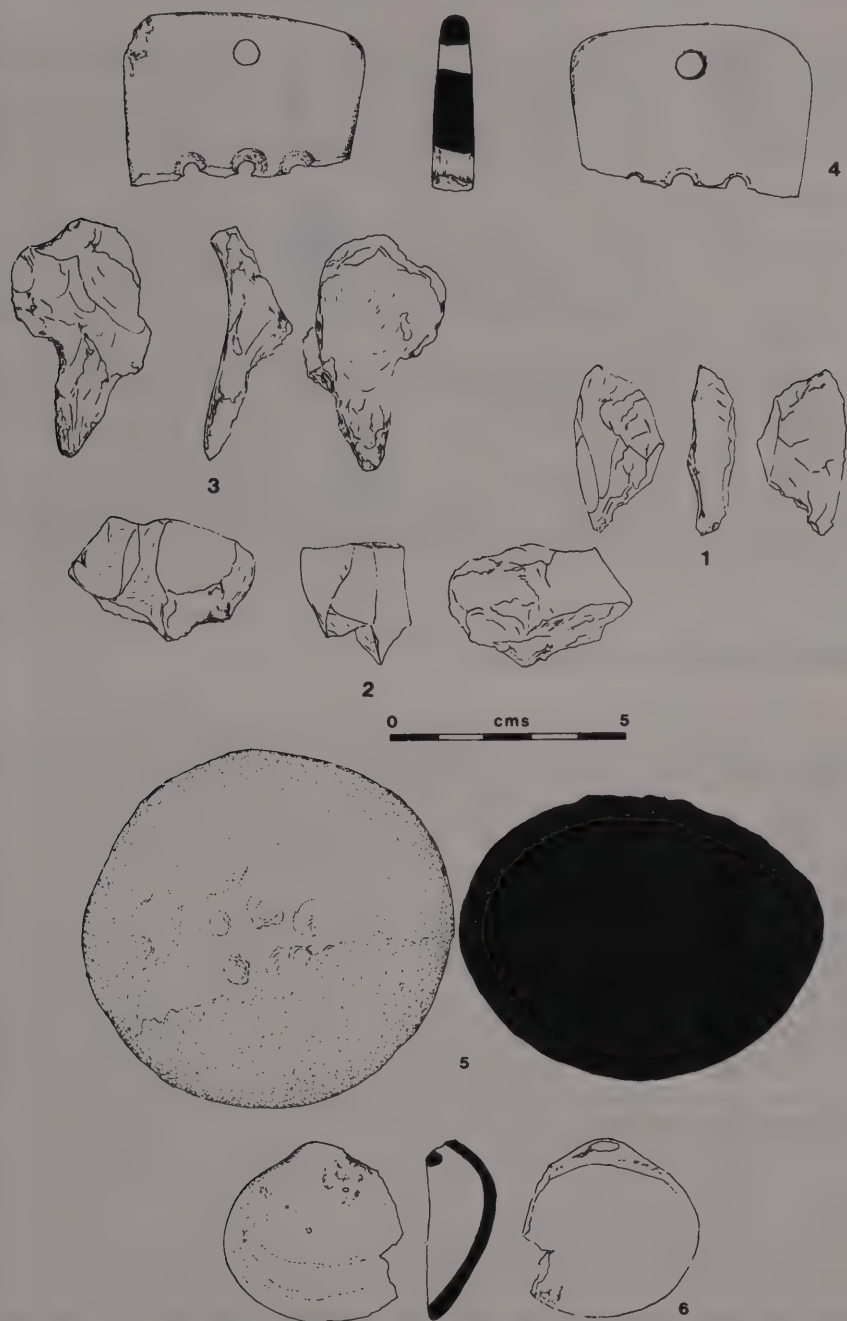


Fig. 2 Finds from Ca na Costa (shell and stone).

All the finds from both excavation campaigns are now on display in the recently inaugurated archaeological museum in the old city of Ibiza.

A revised version of the original Castilian report on Ca na Costa, incorporating the recent features and finds, is planned for publication during the course of 1979.

Descriptions of the finds:

- (i) A small amorphous flint fragment of tabular nature, bluish-grey core, white patina and traces of cortex. (Fig. 2, no. 1).
- (ii) Small pebble nucleus of shiny brown flint with cherty inclusions and traces of cortex. Percussion flake scars and percussion waves (Fig. 2, no. 2).
- (iii) Small side-notched borer of similar flint with signs of working and use – very carefully fashioned (Fig. 2, no. 3).
- (iv) Fragment of a broken wristguard of Beaker type, of fine sandstone, with a suspension hole and the remains of three other symmetrical perforations below. All the perforations smoothly drilled from one side only (Fig. 2, no. 4).
- (v) A round hammerstone of coarse sandstone, flattened at both ends, with marked signs of use (Fig. 2, no. 5).
- (vi) An intentionally perforated seashell – most probably an ornament (Fig. 2, no. 6).
- (vii) Sherds similar to those found during the previous excavation, of varied shapes, all hand-made, probably fired in an open kiln, mostly of grey micaceous clay, finely and evenly tempered, with a scaly core texture. The grits include crushed shell, quartz, limestone and other rock particles (Fig. 3, nos. 1–6). One of them has a repair-perforation (Fig. 3, no. 6).

## II: The stone circles of Cap de Berberia

In October 1976 a first excavation took place at this site (at the southern tip of Formentera) which had already been examined while work was in progress at Ca na Costa. Attention had already been drawn to its existence at the XIVth National Archaeological Congress held at Vitoria in 1975, (Fernandez, J. H., 1977: 476–477). Its reference is latitude 38° 39' 23" and longitude 5° 05' 50" on sheets 824 and 849 of the Spanish Military Map of 1960 (scale 1:25000).

Mañá (1956: 12–16) writes of standing stones (which he admits never having seen himself) in the area of Cap de Berberia. His reference to the site moved Fernandez to locate and examine it twenty years later. By then it had been reduced some ten years previously to a mass of rubble by a stone-crusher and most of its material incorporated into the road which runs across the island and passes alongside the ruined monument. This is reported by local inhabitants to have consisted ten years ago of two stone circles some 1.80 m high. Many of these local people well recall the destruction of the stones and a number of them took part in that activity.

As it now stands (Fig. 4) the monument consists of the ruins of a big circle 13 m in diameter of limestone blocks; the present height of the stones varies between 1.10 m and 0.49 m (Plate IV). This circle represents the remains of an outer wall within which stands another, also of limestone blocks, with a space of 0.50 m between the two. (Plate V). Inside this second wall exist irregular compartments of circular and oval shape around a central space. An entrance is visible on the south side but the northern area is now almost entirely destroyed.



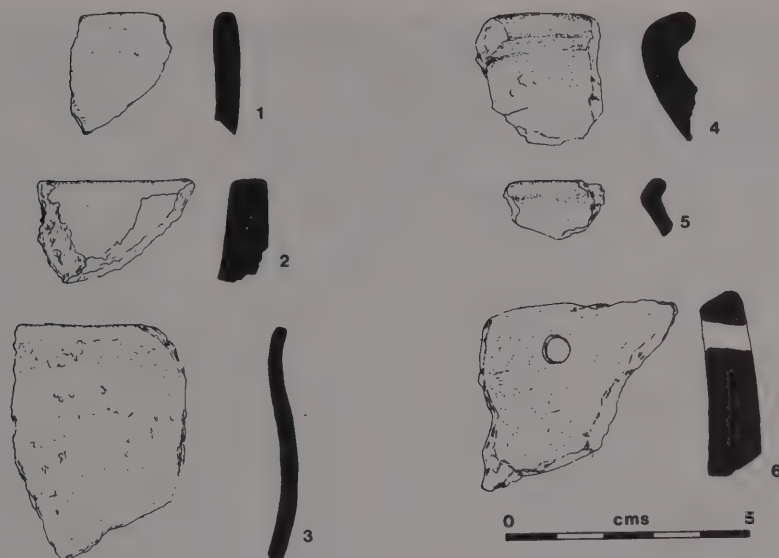


Fig. 3 Sherds from Ca na Costa.

When excavation began the site was merely a mass of stone rubble which had to be removed by hand until the original plan began to emerge.

The only finds so far are minute crushed sherds in the western corner within the second circle. They are all hand-made, unsmoothed and heavily gritted with crushed shell and limestone particles. They could well be contemporaneous with those from Ca na Costa but both their scarcity and minute size make any comparison at present inconclusive. One sherd of a possible flower pot shape with a horizontal lug is shown in Fig. 5, no. 1. Another sherd, a surface find, is part of a channelled amphora of Punic appearance but so atypical that it might quite possibly also belong to the initial Roman period. Its interest lies in the fact that it shows that the site was still known or perhaps occupied at that later date (Fig. 5, no. 2).

During September 1977 the work of clearing, planning and photographing the site continued and it is hoped that a third and final campaign will take place in the spring of 1979.

The most plausible interpretation of this extremely puzzling site, of still undetermined nature, would appear to be that it represents the remains of a habitation. But two of the writers (Topp and Fernandez) cannot reconcile this explanation with the paucity of the finds. It might perhaps be interpreted as a meeting-place where religious and commercial activities took place at determined seasons.

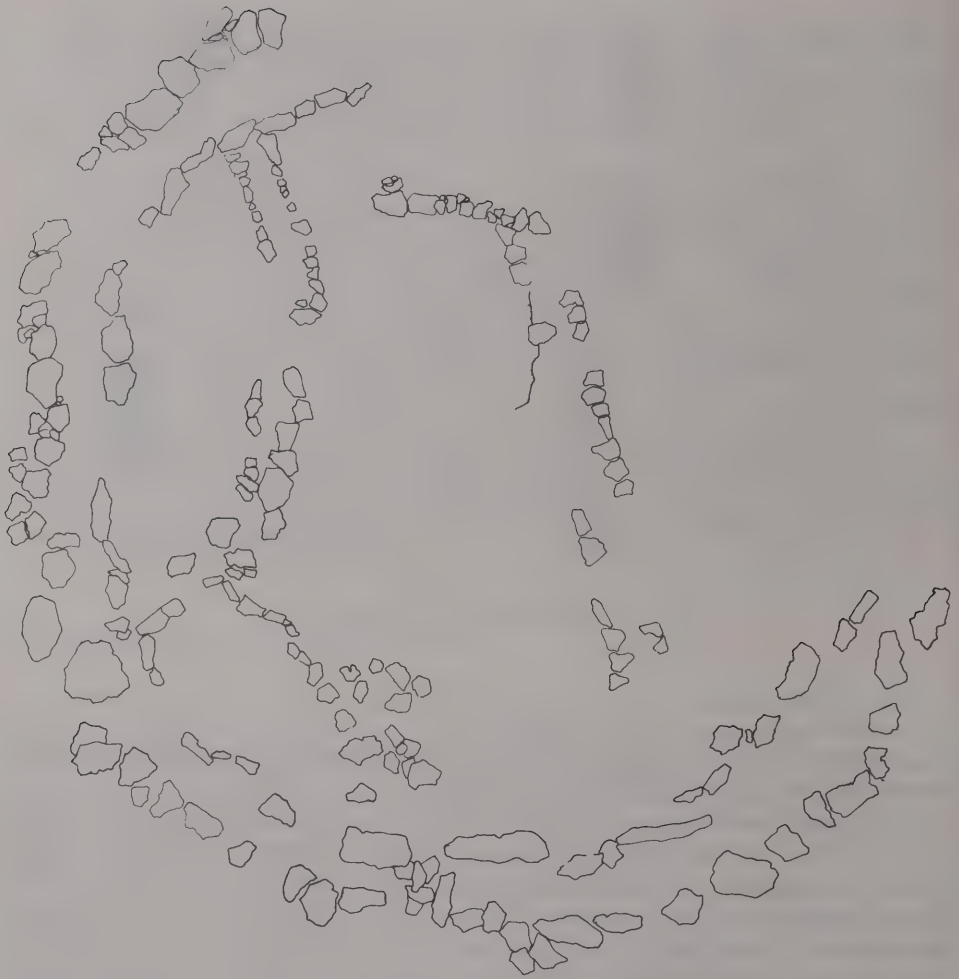


Fig. 4 Plan of stone circles of Cap de Berberia.

Another similar stone structure formerly existed in the locality but it suffered total destruction at the same time as the site just described was ruined. It also might have been a habitation-site and the fact that, despite Formentera's present arid climate, local inhabitants report that there is never a dearth of water in this particular region reinforces this theory. Only future excavation can elucidate the nature and function of these (and doubtless others still unlocated) enigmatic stone circles.

RECENT ARCHAEOLOGICAL ACTIVITIES IN IBIZA AND FORMENTERA



*Plate III* Lateral view of northern sector of outermost circle showing two stone courses.



*Plate IV* Western view of part of the excavation at Cap de Berberia.





*Plate V* Double outer walls of the circle seen from the west.

**Descriptions of the finds:**

- (viii) Minute crushed sherds which could well be contemporaneous with those from Ca na Costa. All are hand-made, unsmoothed, much-gritted with crushed shell and limestone. One sherd of possible flowerpot shape with a horizontal lug (Fig. 5, no. 1). One surface sherd of a channelled amphora of Punic or Early Roman type (Fig. 5, no. 2).
- (ix) Sherds with pierced vertical lugs from La Cala de la Mola (Fig. 6).
- (x) Sherds from Ca'n Sargent I – small fragments, coarser both in texture and grits than those from Ca na Costa. All smoothed. Globular vessels, bowls with more or less everted rims, and flowerpot shapes of which one has a handle which fits with the type known as Early Talayotic in Mallorca and Menorca (Fig. 9, no. 2).
- (xi) Small flat triangular knife-dagger from Ca'n Sargent I. Of bronze and with two original rivets (Fig. 9, no. 3).

### **III: The fortified enclosure of La Cala (La Mola)**

Another site which should prove of interest – and about which little is as yet known – is the fortified area of La Cala, near La Mola, at the eastern end of Formentera. This so far, apparently, uninvestigated complex stands on a cliff, accessible from the seashore. It is a fortified enclosure, some 38 m in length and has two

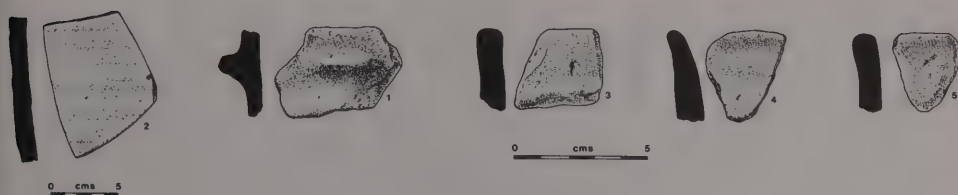


Fig. 5 Sherds from Cap de Berberia.

entrances 19 m apart. Both doorways are built of large limestone blocks. The wall is in a ruinous condition and many of the stones are not in their original position while many others have been incorporated into the surrounding field walls. Some circular enclosures are dimly visible on the east side, masked by dense vegetation.

The few surface sherds are reminiscent of those from Ca na Costa; two others, with vertical lugs, are shown in Fig. 6.

Until the site is excavated no more can be said about it except that it appears somewhat similar to the fortified coastal enclosures known in Mallorca (Mascaró Pasarius 1968: 2823).

#### IV: Cova des Riuets

Almost directly below the above site a cave known as Cova des Riuets was explored by members of the Spelaeological Club of Mallorca in 1974. Within the cave were found sherds of hand-made globular vessels with perforated lugs which fit into a second millennium context. It is interesting to note that many of these sherds

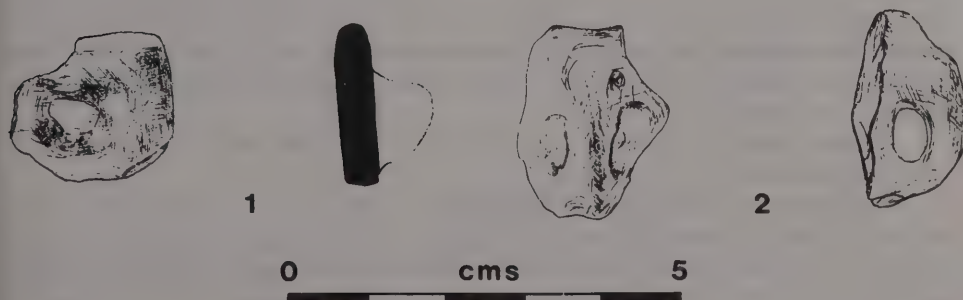


Fig. 6 Lug-sherd from La Cala de la Mola.

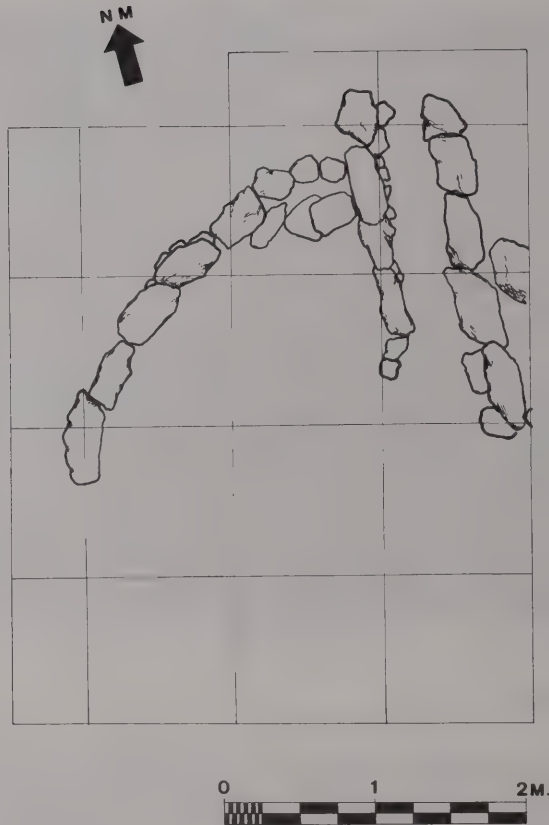


Fig. 7 Plan of Ca'n Sargent I.

had been mended and re-used which argues the poverty of the cave dwellers. Very probably the cave was a habitation site perhaps closely related to the fortified enclosure just above it.

It would seem logical to assume that more caves of this nature still to be found exist in Formentera.

As excavation advances and accelerates it would appear probable that Formentera was well-inhabited in prehistoric times, even on the existing evidence alone. The now destroyed burial in a cave at Portusalé (well-authenticated both by local inhabitants and previous authors) must be taken into account as also the various hoards of bronze axes of many types found in the island (Fernandez, 1973: 177-183; 1974: 63-71; 1977: 471-477). All these finds can now be reviewed in the light of



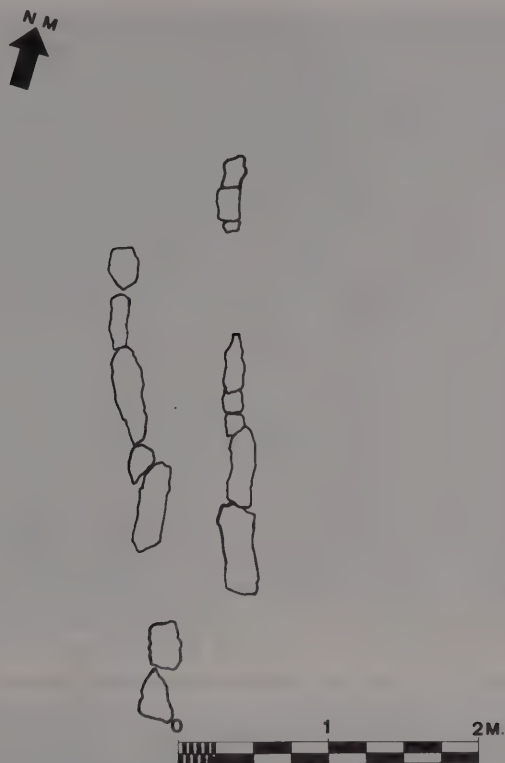


Fig. 8 Plan of Ca'n Sargent II.

present-day archaeological interpretation (Renfrew, 1976) and a similar paradigm to the one Renfrew applies to Arran and Rousay concerning territories might serve also for Formentera – as well as for the social context of the island implied by the megaliths existing within this restricted area.

## B: IBIZA

### I: The megalithic monuments of Ca'n Sargent

Excavation has also been active during these last years in the neighbouring larger island of Ibiza. In February 1978 two recently located megalithic monuments

were examined and partially excavated. As further excavations are planned for February 1979 only a brief résumé of the results so far obtained will be given here.

The monuments (which will henceforth be referred to as Ca'n Sargent I and Ca'n Sargent II) are situated in the southern part of the island not far inland from the airport. Their exact location will naturally be given in the full excavation report to be published after completion of work at the site. So far about one third of Ca'n Sargent I has been excavated; Ca'n Sargent II has as yet not been touched (Fig. 7).

The monuments would appear to be the remains of two possible passage graves some 15 metres apart. They are built of large blocks of the local limestone approximately 1 m high and 0.5 m in width; natural rock formations abound in the neighbourhood and it would be worth trying to locate the exact origin of the stones' quarry.

Last season's work was concentrated on Ca'n Sargent I (Plate VI) of which the passage (Plate VII) and about half of the chamber and surrounding wall have been cleared, excavated, planned and photographed. The site is very overgrown and extensive clearing was necessary before any recognisable profile even began to emerge.

Of Ca'n Sargent II only the passage orthostats are visible at present; the chamber has yet to be located (Fig. 8).

It is very possible, according to aged local inhabitants, that Ca'n Sargent I was explored by Román Ferrer in the 1920s but nothing is mentioned in his notebooks currently housed in the archives of the Ibiza archaeological museum.

The finds from Ca'n Sargent I include numerous sherds somewhat akin to those from Ca na Costa – though far coarser in both grit and texture. This might suggest a later date for Ca'n Sargent than that hopefully attributed to Ca na Costa (i.e. the first quarter of the second millennium BC). The lug-sherd from Ca'n Sargent which would be at home in a context of the period known as the Initial Talayotic in Mallorca and Menorca would serve to strengthen this suggestion – unless it is to be interpreted as a prolonged occupation of the site (Fig. 9, no. 2).

By far the most important find from Ca'n Sargent I, in the southwestern sector of the chamber, was a small flat triangular bronze knife-dagger (Fig. 9, no. 3). It originally possessed two rivets, one of which was still in position when unearthed though it has unfortunately since disintegrated. This tiny knife-dagger has numerous analogues both in the Iberian Peninsula e.g. at Castillerejo de los Moros, province of Valencia (Fletcher Valls & Alacer Grau, 1958: Pl. X, No. 2) and in Mallorca (Veny, 1968, Plate XLVIII and Plate LIV) as well as many others further afield.

Beside the knife-dagger were found human bones which are currently being investigated by the laboratory of the British Museum with a view of obtaining a C<sub>14</sub> dating.

The importance of Ca'n Sargent I is that it provides evidence that Ibiza also was inhabited during the Pre-Talayotic period in the early second millennium BC as were the other three islands of Mallorca, Menorca and Formentera.

The existence of a small Western European Tanged dagger of Beaker type in

RECENT ARCHAEOLOGICAL ACTIVITIES IN IBIZA AND FORMENTERA



*Plate VI* Overall view of Ca'n Sargent I from the north.



*Plate VII* View of the passage from the south.



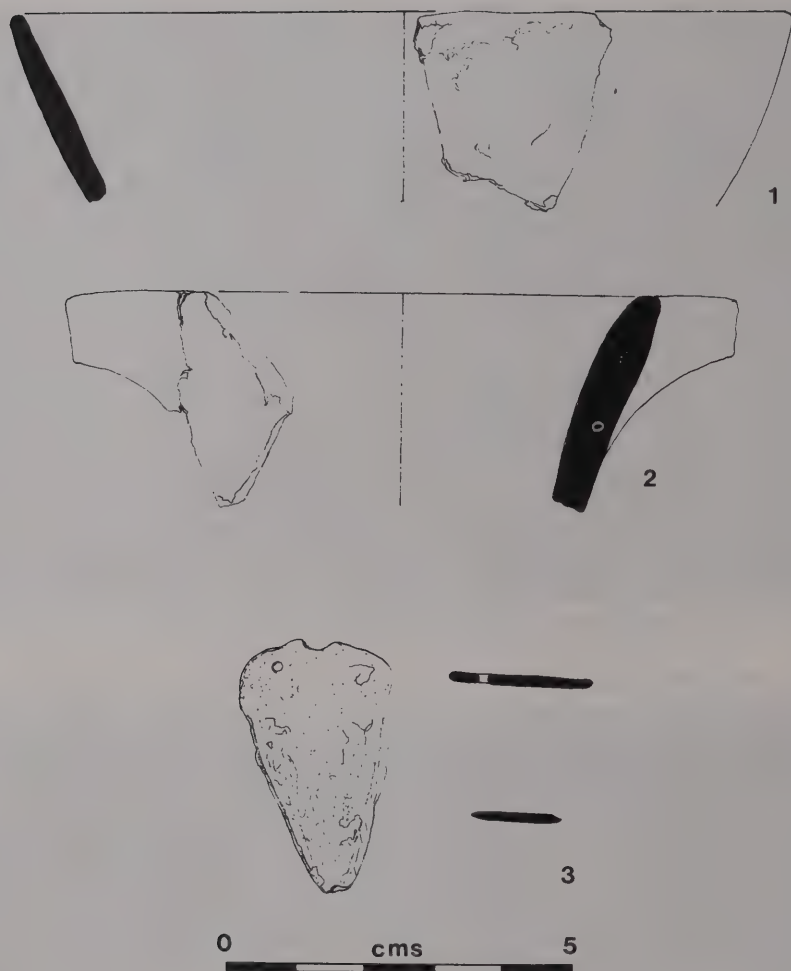


Fig. 9 Finds from Ca'n Sargent I.

the museum of Ibiza is yet a further proof of this early occupation of the island. Unfortunately nothing is known concerning the provenance of this extremely well-preserved dagger beyond the fact that it was quite undoubtedly found in Ibiza (Sora Boned, 1944: 20). Taken in conjunction with the broken whetstone from Ca na Costa and the incised sherds from the same pit it establishes the certain existence of inhabitants in these Pituissae islands at the beginning of the second millennium BC.

## Acknowledgements

All the expenses of the excavations were as always financed by the Comisaría de Excavaciones Arqueológicas.

The writers wish to express their deep gratitude to Professor J. D. Evans, Director of the London University Institute of Archaeology, for the prompt publication of this paper, for his great patience and understanding and for generously undertaking the labour of editing and proof-reading.

Thanks for constant volunteer work in the field are due to the following: Juana Ferrer, Rosa de Hoyos, Blanca and Helena Pastor and various other members of the local Archaeological Society for occasional assistance.

## Abstract

This paper is a summary of archaeological activities in the islands of Ibiza and Formentera during the years 1977 and 1978. It describes the new features and finds of the megalithic chamber-tomb of Ca na Costa during the second and final campaign there in April 1977. Next come a brief report on the preliminary excavation at the stone circles of Cap de Berberia, a description of the fortified enclosure of La Cala de la Mola and of the finds from the cave immediately below (Sa Cova des Riuets) – all in Formentera. The partial excavation of the first megalithic monuments ever discovered in Ibiza, Ca'n Sargent I and II, possible passage-graves, and the finds therefrom are next described. As the result of the above activities the conclusion that both these Pitiussae islands were inhabited during the early second millennium is now firmly established.

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# A comparative chronology of Sinai, Egypt and Palestine

by BENO ROTHENBERG and IVAN ORDENTLICH

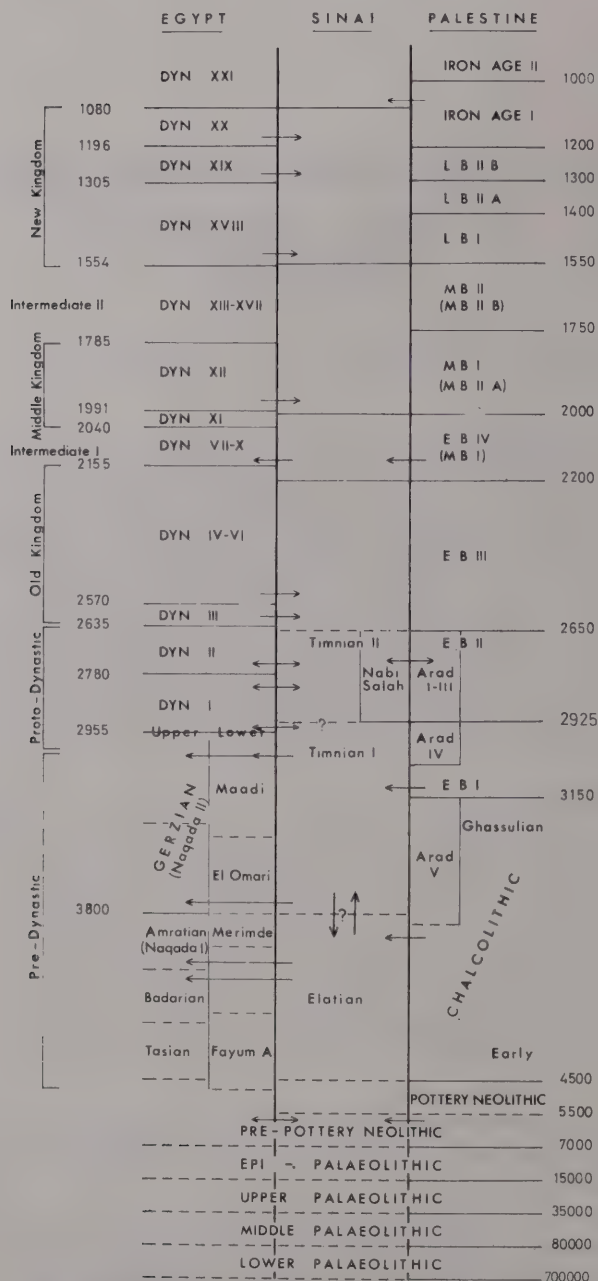
A detailed archaeological and archaeo-metallurgical survey of the Sinai peninsula was begun in 1967 by the 'Arabah Expedition'<sup>1</sup>, directed by Beno Rothenberg, and was carried out in numerous trips of 2–3 weeks each, until 1978. If we include also the sites located during the short Sinai survey in 1956/57 (Rothenberg, 1961) and the sites in the Wadi Arabah (Rothenberg, 1962, 1967, 1967a, 1968, 1979) – and to do so would be archaeologically fully justified – our survey map of the area from the Suez Canal to the Wadi Arabah shows at present 715 ancient sites. The survey was begun as an investigation of the ancient mines of Southern Sinai, but was gradually extended to cover most of the Sinai peninsula, including a 5 km wide strip along the east side of the Suez Canal<sup>2</sup> (Rothenberg, 1969, 1970, 1972, 1974, 1975, 1979).

The chronological table published here represents a summary of the chronological aspects arising from our Sinai and Arabah explorations and the systematic comparative investigation of the finds from over 700 sites. Considering the historical and cultural connections of Sinai with its surrounding areas, it seemed imperative to compare the chronology of Sinai with that of Egypt and Palestine. Most suitable for a comparative chronology of Sinai, Egypt and Palestine were the chronological tables published for Egypt by J. von Beckerath (1971: 63–68), and for Palestine by M. Avi-Yonah and E. Stern (1978: 1226–1228). We were also greatly assisted by Hennessy (1967), Kantor (1965), de Vaux (1971) and Kempinski (1978).

The final full report on our Sinai survey is now in preparation (Rothenberg *et al.*, in preparation) and will also include a detailed discussion of the chronological table pre-published here.

Sinai, the desert triangle 'hanging' between Asia and Africa and serving as the only landbridge between Egypt and the Levant, naturally reflects the cultures and historical events of its neighbours to the west, north and east. It was therefore first assumed that the ancient remains of Sinai could be dated by comparing its architecture, pottery, flint and metallurgy with similar finds from Egypt and Palestine. Up to

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Arrows indicate connections between Sinai and its neighbours to the east, west and north (trade, cultural links, intrusions).

the Neolithic we could indeed use the chronological criteria and terminology of Stone Age Africa and the Levant, but from the very beginning of the Chalcolithic, in the middle of the 5th millennium BC to the end of the Early Bronze Age, the later part of the 3rd millennium BC, the use of Egyptian or Palestinian chronological criteria for the dating of the sites of Sinai caused considerable difficulties (Rothenberg, 1972: 37). These difficulties were enhanced by the fact that at most sites in Sinai no more than a handful of sherds could be found with only occasionally a few rims or base fragments. In fact most of the sherds came from rough, locally hand-made holemouth jars or cooking pots which could not, on their own, help in dating the sites.

However, in contrast with the small number of diagnostic sherds found in Sinai, a very large quantity of flint implements was collected and a clearly defined sequence of the flint industries of Sinai could be worked out.<sup>3</sup> It was only after the comparative study of all archaeological parameters of several hundred sites of central and south Sinai and the Arabah – architecture, pottery, flint industries, metallurgy – that the existence of two distinct local cultures became apparent, called, after key sites in the Arabah, ‘Elatian’ and ‘Timnian’ (Ronen, 1970: 30–41; Kozloff, 1974: 35–49).

Once the existence of a local, mainly indigenous population with its own flint industries and pottery became established, the chronological framework of Sinai and the Arabah became evident and various aspects of the early history of the area, including Egypt, Palestine and Arabia, began to appear in a new light (Rothenberg, 1979).

A small group of Early Bronze II trading settlements, contemporary with the local Timnian II culture, and characterised by imported Canaanite pottery, were identified in southern Sinai (Rothenberg, 1970, 1979) and called, after the largest EB II site in Sinai (Rothenberg, 1970; Beit Arie, 1974) the ‘Nabi Salah Facies’. Because of apparent material connections between Nabi Salah and Arad (Amiran, Beit Arie and Glass, 1973; Rothenberg, 1978: 14 n.15) it was very interesting to compare our chronological conclusions with the chronology of the important excavations of Chalcolithic-Early Bronze Arad, the southernmost large outpost of the Palestinian Bronze Age (Amiran, 1978: 116; 1978a: 182–184). Although the ‘Nabi Salah’ intrusion was, from the point of view of the long history of Sinai, only a short episode (Rothenberg, 1979), its appearance in Southern Sinai was archaeologically of considerable importance and is, therefore, explicitly indicated in our table.

The indigenous cultures of Sinai seem to have disappeared towards the middle of the 3rd millennium BC, when Sinai became a large mining enterprise of the Old Kingdom of Egypt. From the 3rd Dynasty onwards, with short interruptions during the 1st and 2nd Intermediate periods, Sinai was completely dominated by Dynastic Egypt and its chronology. No remains of any local population datable to any of the periods after the 3rd Dynasty could be identified in Sinai; the Beduins of that time – indicated by inscriptions at Maghara and Serabit el Khadim – were, as far as archaeology is concerned, a nonentity.



During the 1st Intermediate period no Egyptian presence is documented in Sinai, but extensive traces of intruders from the east and north were found all over northern and central Sinai – identified by pottery of the Early Bronze Age IV of the Levant. We are using EB IV for Albright's M.B.I and Kenyon's EB-MB (Oren, 1973: 35–37).

Only during the Early Iron Age, with the withdrawal of Egypt from its eastern provinces, does Sinai show a new connection with the Levant. Palestinian Iron Age pottery was identified in a number of Bronze Age settlements of central and southern Sinai, though no proper Iron Age settlements were so far located west of the Negev mountains.

<sup>1</sup> The 'Arabah Expedition' was founded by B. Rothenberg in 1959 to investigate the ancient remains of the Wadi Arabah, between the Dead Sea and the Red Sea, and was incorporated in 1975 as 'The Institute of Mining and Metals in the Biblical World, Museum Haaretz Tel Aviv'. Ivan Ordentlich joined the research team in Israel in 1976 and is in charge of archaeological finds.

<sup>2</sup> The Arabah Expedition did not work in the Mediterranean coastal area of northernmost Sinai. This area was thoroughly covered by E. Oren of the University of the Negev, Beersheba (Oren, in Rothenberg, 1979).

<sup>3</sup> A detailed report of the flint industries of Sinai, prepared by B. Kozloff of the Institute of Mining and Metals in the Biblical World, Tel Aviv, will shortly be published in (ed.) Rothenberg, *New Researches in Sinai*, Vol.1.

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in preparation





# Summaries of M.A. and M.Sc. Reports for 1977/78\*

## **Lemba Lakkous and Kissonerga Mylouthkia: An analysis of chipped stone from two Cypriot Chalcolithic sites.**

The two sites chosen for examination, Lemba Lakkous and Kissonerga Mylouthkia, are both Chalcolithic but differ greatly in many respects, despite the fact that they are only 2 or 3 km apart. Lemba is a settlement with round houses, cement floors, and a central posthole to support a sloping roof. Mylouthkia consists of a series of pits of varying size and shape, some containing heavy concentrations of occupation debris. The paper attempts to compare and contrast the chipped stone from the two sites and to place them in the context of Cypriot prehistory, and also looks at raw materials and their uses in the assemblages.

The two assemblages have proved to be typologically very similar, and can certainly be classified as the same industry. There are differences however which may well be related to a variation in activities at the two sites. It is difficult to relate this industry to others known on the island because of the lack of adequate comparative material. The closest parallel is with Kalavassos A and B, with rather more distant links with Erimi.

Alison Betts

## **An analysis of Molluscs and sediments from Bronze and Iron Age ditches at Fengate, Peterborough, Cambridgeshire**

Molluscan and sediment analyses of ditch deposits at Fengate (Cambs.) (centred around TL213989) were undertaken in the hope of discerning information about ditch function, the nature and causes of ditch infilling, past episodes of land use, and changes in the local environment.

The molluscan analyses of Bronze and Late Iron Age ditches at Fengate revealed conditions of waterlogging in the ditches, and damp, scrubby and unkempt ground cover conditions. The comparative site at Billingborough Fen (Lincs.) (centred around TF135344) on the silt fen margin revealed a similar picture. But there was evidence of an incursion of sea-water sometime in the earlier 1st millennium BC which probably caused the abandonment of the site.

Samples for comparative molluscan analysis were also taken from Wicken Fen (Cambs.). It is the closest modern equivalent of an undisturbed fen margin site, although it is artificially maintained as a sedge fen. The ecological groups of molluscs represented and the contexts in which they were found agreed remarkably well with the impression gained from the snail analyses of both prehistoric sites.

Four techniques of sediment analysis were used to place the molluscan analyses in their contexts: pH determination, a particle size analysis and accompanying statistical estimates, the determination of the alkali-soluble humus and free iron contents were used. By these techniques it was possible to suggest sequences of ditch infilling and the sources involved. The Bronze Age ditches were characterised by partial waterlogging in the primary and lower secondary fills, and thereafter by relatively uniform and rapid natural processes of infilling with sandy loam and loamy sand sediments. The Late Iron Age ditches were characterised by waterlogging in the primary and lower secondary fills, then by a possible combination of deliberate back-filling and natural processes of erosion, as well as by recutting of the ditches, and finally by a freshwater-carried incursion of sandy clay loam to clay which may be dated to the mid-3rd century AD. This probably caused the final abandonment of the Cat's Water settlement site.

C. A. I. French

\*Except where stated otherwise, *Reports* are housed in the Institute of Archaeology Library.

### **Temple sculpture in Roman Britain**

This is a survey of the sculpture known to have come from temples in Roman Britain, or, at least, most likely to have done so. It includes a discussion of most of the important pieces of sculpture from some forty sites, in both stone and metal.

The material is divided into civilian and military sites, and within these groups is categorised regionally. The *Coloniae*, however, are considered together.

The discussion focuses mainly on the question of style and influences on it. Some of the usual stylistic interpretations of major pieces are reconsidered, and an attempt made to assess the relative importance of Classical and Celtic Art. Other likely factors on style, such as date and the importance of the concept of popular art, are also considered.

The question of identification of cult-statues, is, when relevant, also touched upon, and the relation between the sculpture of a site, and the degree of Romanisation of the general area, also assessed.

The availability of material emerges as an important factor on the distribution of various types of sculpture.

Illustrations accompany most of the objects under discussion.

S. J. Pattison

### **Roman rural settlement in southeast Sussex, with particular reference to the Romano-British site on Frost Hill, Beachy Head**

The main aim of this report is to examine the interim results of the Roman part of the 'Bullock Down Multiperiod Settlement Project' in their wider local context. The region chosen for this wider investigation is that area of the Downs and Coastal Plain between the Ouse Valley to the west and the Pevensey Levels to the east.

Basic information concerning the Roman discoveries on Bullock Down is provided in Section I, and Section II contains very brief information and references concerning the other sites discussed in the regional survey. In this survey (Section III) I have attempted to investigate the following topics: The Settlement Pattern; The Settlement Sites; The Economy; Pottery; Coinage; and Bronze Objects. Finally, in Section IV, I have outlined what I consider to be the major areas and problems for future Roman studies in the region under review.

David R. Rudling

### **Trace element analysis of soil from graves**

The original intention was to analyse a large number of samples from a variety of graves for copper, cobalt, iron, manganese and phosphate, using atomic absorption spectrophotometry and colorimetry. The aim was to demonstrate the magnitude and nature of changes in elemental concentration which might be expected at the level of a body.

The digestion method, however, proved to be unsatisfactory, so another method had to be adopted. Both methods are described in detail.

Samples were prepared by each of the two methods and the results given by each were compared.

The more satisfactory method (a microanalytical technique, using sulphuric and perchloric acids) had much in its favour, although readings for copper and cobalt were unavailable. The results produced by this method for manganese and phosphate were significantly correlated with the results produced by the unsatisfactory nitric and perchloric acids method.

Further work, to improve and standardise the microanalytical technique, is recommended.

Amanda Saunders

### **Climatic change in Greater Mesopotamia between the end of the Pleistocene and the beginning of the Historical Period: the nature of the evidence**

Firstly a brief summary of evidence for the climate of the Late Glacial Period is given. It shows North Mesopotamia in the cool temperate zone and South Mesopotamia and the Persian Gulf, which was then dry land, in an increasingly arid zone. The Mediterranean zone was displaced westward to Morocco. Chapter 2 deals entirely with the problem of eustatic change and tectonics in the area. The next chapter discusses some of the general evidence for worldwide post-glacial climatic trends. Then evidence from the Near East is considered. This includes sediment analyses from the Persian Gulf and the Gulf of Aden, measurements of lake levels throughout the region, observed changes in river discharge and aquifer levels and finally pollen cores from Lake Zeribar, the Ghab valley and the Kashmir valley.

## SUMMARIES OF M.A. AND M.SC. REPORTS 1977/78

The Early Postglacial Period seems to have been a transitional period during which time the climatic zones expanded and moved northwards. Then between about 7000 and 4000 BC the monsoonal zone extended northwards into the arid zone, well beyond its present limit, providing increased rainfall to most of the Arabian peninsula and the shores of the Persian Gulf. However, this amelioration of climate does not seem to have reached as far north as Mesopotamia, which remained arid and relatively inhospitable, except around the northern and eastern fringes.

Helen M. Thomas

### **Settlement patterns, site hierarchies and territorial organisation in the Classic Maya Lowlands**

Analysis of epigraphy and settlement patterns in the Classic Maya lowlands has helped to reveal information on site hierarchy and territorial organisation. Decipherment of Mayan hieroglyphs indicates that there were at least four regional capitals – Tikal, Copan, Palenque and Calakmul (?) – with each capital being surrounded by secondary, tertiary and quaternary sites, and this comprised the territory of political control of the respective political capitals. Discoveries of large densities of obsidian at Copan and Tikal suggest that the regional capitals were commercial centres as well as political. Unfortunately, poor preservation of hieroglyphic inscriptions at one centre, Calakmul, prevents us from knowing for sure if it was a capital. Uncertainty about the power of other centres, such as Seibal and Yaxchilan, further prevents us from knowing the precise number of political capitals, for the moment at least. But Mayan centres were definitely not coequal. Rather, the establishing of regional capitals indicates that there may be a correlation between power and status as inferred from hieroglyphs, and size and complexity as revealed by archaeological survey.

Additional information on settlement patterns indicates that sites were rather evenly distributed throughout the lowlands, but with some regional variation. There was a noticeable increase in the density of sites in the northeast Peten. This increased density may be a result of the early development of urbanisation at Tikal, possibly owing to outside influence from Teotihuacan and highland Guatemala, which led to initial domination and its emergence as an attracting political power. This dominance perhaps stimulated the creation of the state in the lowlands.

W. M. B. Welsh

### **A study of extractive metallurgy in its context: ancient copper mining in Iran**

A model is proposed for examining ancient extractive metallurgy in the context in which it took place by studying the physical, social and economic constraints on the use of an ore deposit, and the fluctuations of these factors through time. This model is then applied to four copper deposits in Iran: Talmessi, Chahar Godbad, Qaleh Zari, and Delichay.

Sandra K. Zacharias





# Summaries of Undergraduate Reports for 1977/78

## **Huaman's House. An ethno-archaeological excavation at Esquina Alfalfapata, Qquente, Peru**

Huaman's house is a small stone structure at Hacienda Qquente in the Lower Urubamba Valley, Peru, that has been abandoned for a number of years. In June 1977 it was excavated as an archaeological site, as part of the Cusichaca Project. When the excavation was completed, Sr Huaman, who still lives close by, was asked about the history and use of the building.

The aim of this experiment was to compare the two forms of evidence, to provide a logical interpretation of the site, and to discover what could only be learnt from an eye-witness account. However, it was found that Huaman's evidence was not necessarily any more accurate or 'true' than the archaeological interpretation. Furthermore, because of the paucity of the archaeological evidence, much of the interpretation was conjectural, based on ethnographic inference.

In a more positive vein, the interview with Huaman did provide new evidence about the changes in the area over the last fifty years and this enabled the excavation of the single-room structure to be seen in a wider ecological context.

Edward Armstrong-MacDonnell

## **The lead-glazed wares of Roman Britain**

Most of the known examples of Romano-British lead-glazed vessels are listed in a corpus and arranged in groups for probable production centres, some known, others unknown. Each group is then analysed in detail in order to assess their individual characteristics, distributions and chronologies. The phenomenon of Roman lead-glazed pottery is examined first on an Empire-wide basis and secondly as a particular phenomenon occurring amongst late first and early secondary century fine wares in Roman Britain.

An extended version of this paper has recently been published.<sup>1</sup>

<sup>1</sup>P. Arthur, 'The Lead Glazed Wares of Roman Britain' in P. Arthur and G. Marsh (eds.), *Early Fine Wares in Roman Britain*, B.A.R. British Series 57, Oxford 1978, pp. 293-355.

Paul Arthur

## **Woman in prehistory: an examination of the archaeological evidence relating to the function and status of the female**

This work comprises a wide-ranging and, inevitably, selective survey of data from prehistoric cultures in Eastern Europe. It examines how the dimension of sex, with the emphasis on the female, may be reflected in the archaeological material.

The review concentrates upon figurine material, objects of costume and adornment, and skeletal and cultural data from burial contexts. The evidence for the various economic activities of woman is examined. There is a brief consideration of the female's biological constraints and in particular of her function as a child-bearer.

The work includes a discussion of how the archaeological data may relate to the different variables of social status, such as wealth, age, etc., together with reference to relevant studies in the archaeological literature. A number of references are also made to the extensive anthropological literature on the subject of woman in society.

The dimension of time is introduced with a view to considering how female status and function may respond to changes in social and economic complexity.

Rather than trying to present untenable conclusions or generalisations, this study attempts to outline the nature of the problem and to draw attention to areas of potential interest and possible hazards.

Catherine Atkinson

## A few molluscan faunas from Winterton Roman Villa

Little is known about the land molluscs which may be preserved on Roman sites and their potential contribution to our knowledge of the environments of such sites. This study, on the Roman Villa at Winterton in Lincolnshire, makes an attempt to interpret land snail faunas in relation to context of occurrence and to past environments. Unfortunately, the only contexts which yielded significant numbers of shells were ditches. The problems of interpreting ditch assemblages are emphasised and the snail evidence compared with that from other studies of the charcoal and pollen remains. Evidence from Bronze Age and Iron Age features is also considered. While few positive conclusions are reached, the practical problems of undertaking land snail analysis, of sampling, and of working with ditch-fill contexts are discussed.

Beverley J. Collinson

## Treasure hunting: a discussion and survey

The first half of the report discusses the incentives and interests of different types of treasure hunter – those whose interests lie in amusement and education, and those for whom financial gain is more important. National treasure hunting agencies such as the N.A.M.D.C. and the B.T.H.A. and particularly *Treasure Hunting* magazine, are seen as potential influences for educating the elusive individual treasure hunters whose ignorance rather than greed are threatening archaeological material.

The 'academic and social' dilemma of treasure hunting is discussed and the archaeological responses from Bournemouth, Norfolk and Wessex are considered. A short section on the legal position regarding England and Wales is included, with particular reference to treasure trove, Sites & Monuments legislation, and theft.

The second half of the report is an analysis of a national series of questionnaires distributed to every museum with archaeological collections in Great Britain, a selection of regional field archaeology organisations, and every readily known metal detector and treasure hunting club in Great Britain. Its purpose is to ascertain the nature and gravity of treasure hunting throughout the country, consider the responses the archaeological establishment are employing, discover some of the incentives, interests and activities of treasure hunting clubs, their attitude towards archaeologists, and the level of their recording techniques.

D. R. Crowther

## An examination of some pottery from Cherry Hinton and Horningsea, Cambridgeshire

This paper attempts to re-examine two kiln sites excavated early this century. The kilns at Horningsea were evidently a major centre of coarse ware production for the Cambridge area in the second and third centuries, and this report attempts to produce a description of the forms and fabrics produced there.

The kiln site at Cherry Hinton was not fully recognised as such by its excavator, but it is evidently a fairly important production centre of first century fine wares. These are described in the paper and their origin and chronology discussed.

Jeremy Evans

## Archaeological iron

The role of metallurgy has often been neglected in the archaeological record. Whereas technological features have long had importance in palaeolithic archaeology and have often been demonstrated and recognised, the complexities of metal working technology are often not given adequate attention.

This report attempts to show the limitations of typological classification of metallic artifacts and the difficulties of studying the primary extraction methods. Most emphasis is placed on the application of metallographic analysis on archaeological objects made of iron or steel and analysis of knives excavated at a 16th/17th century forge and an 18th century fulling mill at Ardingly, Sussex.

It is concluded that the value of metallographic analysis is that it can be conducted on a small scale and useful conclusions can be drawn from the results.

Marga Foley



## SUMMARIES OF UNDERGRADUATE REPORTS 1977/78

### **Two sites in Swaziland and their stone tool assemblages**

The report describes the excavation of two sites in western Swaziland and the stone tools obtained from them. The first site described is a vast stone tool workshop on Ngwenya ridge. Artifacts were recovered primarily from a scree horizon and are regarded as being in secondary context. The assemblage is compared to Final Acheulean (Fauresmith) assemblages in southern Africa, though there is evidence that the site was also used by Middle Stone Age tool makers. The second site described is on and around a koppie (tor) near Hlalakahle village. Material from the top of the koppie is thought to have moved downslope as the result of water action and the artifacts are not in primary context. The site is interpreted as a stone tool workshop, though it would also have been suitable for a game observation post. The assemblage is compared to other Final Middle Stone Age samples in southern Africa.

The classification of stone tools in Swaziland is to be undertaken using a system created by R. J. Mason for the Middle Stone Age. The defects of this system are discussed and the use of Kleindienst's typology is proposed.

Angela Fussell

### **Pre-Columbian metates from lower Central America**

Metate is the name commonly used to describe the hand grinding stone of the pre-Columbian period. In Lower Central America the metate assumed astonishingly elaborate aspects, both in form and decoration.

An attempt has been made, firstly, to isolate certain functional and stylistic features in order to determine whether links with either of the well-established high cultural traditions of the North and South can be recognised, or whether the Isthmian metates represent a development of indigenous traits.

Secondly, a group of elaborately carved metates from Lower Central America belonging to the Ethnographic collection at the British Museum, and not previously published, has been examined in an endeavour to classify the objects by comparison with material known from published sources and from museum and private collections.

Ursula Jones

### **A survey of archaeology teaching in secondary schools and adult education in Greater London**

Archaeology is considered by many teachers to be an ideal 'link' subject, as it can encompass many other school subjects. However, although it is widely taught on a non-examination basis, archaeology was taught as a timetable public examination subject (CSE Mode 3 and GCE Alternative Ordinary Level) in only 8 schools in Greater London during the year 1977-78. The report discusses examination syllabuses, teaching methods and aids, activities such as field walking, experimental archaeology and school visits, and teacher training.

Archaeology is taught more widely in adult education; there are many non-examination classes, provided by the Workers' Educational Association, the Local Education Authorities and the University of London Department of Extra Mural Studies. The latter also provides a growing number of examination classes (Certificates in Field Archaeology and Diploma in Archaeology). The subject matter of these classes, a study of the people attending archaeology classes and various problems in the teaching of archaeology to adults, are some of the topics included in the report.

In conclusion it is felt that a large pool of knowledgeable or qualified teachers of archaeology is necessary - more archaeology graduates could be encouraged to take up teaching; archaeology in general should gear itself to providing more help in the education and leisure time pursuits of a growing number of people.

Bernard Johnston

### **Grave material from Buenos Aires, Costa Rica: a study of the collection lodged in the British Museum**

The contents of 48 graves from a cemetery at Buenos Aires, Costa Rica formed the basis of this report. The grave groups date from the late pre-conquest period and appear to be intact. The material, mainly pottery, has been illustrated, described and compared with finds of similar date from cemeteries in southeastern Costa Rica and western Panama. A discussion of the grave groups and their possible relationship to social organisation has also been included.

Wendy McIsaac

### **The archaeology of the Stanton St Quinton area**

Light soils, easily worked, good water supply and drainage, easy communications. These are the attractions of this area centred on the Great Oolitic Limestone plateau of the Cotswolds, bounded to the East by the Valley of the Upper Avon.

Such an area offers many advantages to agricultural folk of any period, but especially to early communities possessing few effective farm implements.

Present knowledge does not, however, show much evidence of any intensive exploitation of the area in ancient times.

Thin scatters of Paleolithic, Mesolithic and Neolithic artifacts are followed by an absence of any Bronze Age domestic activity, although both Neolithic and Bronze funerary monuments do exist in small numbers. The Iron Age too is poorly represented, and it is not until the Roman conquest that real activity appears, with the establishment of settlements probably growing out of military guard posts, at Nettleton Shrub and Easton Grey, along the original frontier line of the Fosse Way. The Settlement of Sandy Lane developed too, possibly to provide a market for the products of the iron smelting industry on the adjacent greensand, the proceeds of which could well have financed the building of the close set group of villas near the town, whilst the Villa at Stanton St Quintin was probably the centre of an agricultural estate.

The area has been little examined in recent years, and future work will probably do much to revise the picture seen at present.

P. J. E. Marshall

### **The Huarpa concept at Huari: a pre-urban society?**

Research into the prehistory of Peru has generally been involved with the study of the diffusion of stylistic traits, stylistic seriation and typologies.

In this dissertation an attempt was made to detect cultural change as a process, as it may be observed in the archaeological data.

The assumptions were made that a few of the processes involved in the development of urbanism are an increase in craft specialisation, denser site occupation and the use of specific areas within a site for specialised craft production.

Surface material systematically collected from various different areas at the site of Huari, belonging to two distinct consecutive time periods, the Early Intermediate Huarpa and the Middle Horizon I phases, was used.

Vessel shapes recognised from rimsherds were grouped in particular types and the attributes used in the analysis compared statistically the variability existing within each vessel category. By this method a comparison between the Huarpa and Middle Horizon I collections was made, this to detect whether pottery was significantly more standardised in the Huarpa or in the Middle Horizon I phase. The latter period is generally considered to have been urban at the site of Huari. The results seemed to confirm this viewpoint. This particular material from Huari indicated that the Huarpa period represented a less urban type of society than the Middle Horizon I phase.

F. M. Meddens

### **Molluscan analysis of two Early Iron Age hill-forts in West Sussex**

The sites which were studied are two contemporary hill-forts on Beacon Hill in Harting and Chanctonbury Ring in Wiston, both situated on the South Downs in West Sussex. Excavation revealed little, if any archaeological evidence of their functions, therefore a molluscan analysis was undertaken of the defences near the entrances to these hill-forts. It was hoped that the Mollusca might give some indication of the possible nature of man's Iron Age activities at these sites.

At Harting Beacon samples for molluscs were taken from the defences at the western entrance to the hill-fort. The Mollusca indicate that the local environment of the defences possibly supported moist, overgrown, grassy vegetation interrupted by patches of bare ground. I suggest that as the samples were taken from the entrance the broken ground might have been created by trampling.

At Chanctonbury Ring the samples were taken from the defences near the eastern entrance to the hill-fort. The molluscan evidence suggests that the environment in the vicinity of the defences supported a rich cover of moist vegetation.

At both sites the Mollusca give no indication of any severe form of land-use such as intensive grazing or cultivation.

Karen A. Petzoldt

## SUMMARIES OF UNDERGRADUATE REPORTS 1977/78

### **The surface finishes of ceramics: a study in their identification**

The aim of this paper was to see, using replication and then archaeological samples, whether it is possible to determine more accurately the surface finish given to ceramics.

Part I of this study dwells on literary evidence for surface finishes and defining them, using primarily modern potters terms to avoid ambiguity. It describes the processes of making the finishes, some of the clays and tools necessary and the firing sequences used in the production of such surfaces as the gloss on Greek red and black attic ware.

Part II describes the method used for replicating surfaces. It then describes the analytical techniques chosen, surface analysis and thin section. Using surface analysis, entailing looking at the ceramic surface at approximately  $\times 10$  magnification, it is possible to identify with assurance, various features diagnostic to the production of the ceramic. For example, slurries and scraping can be distinguished, sometimes showing at what stage scraping was accomplished. Colour changes due to burnishing rather than slipping are also discussed. Thin sectioning sample also proved invaluable when trying to determine the presence or absence of a slip. It appears to be useful primarily as a X-check on surface analysis and to have little merit on its own.

Part III looked at archaeological samples to see how they stood up to examination. The main problem encountered was with overzealous cleaning with brushes that destroyed evidence for surface finish on softer Romano British material. Huari (Andean) material offered an interesting problem, in that it was glossy, not burnished, and it has been hypothesised that this is due to an illitic slip, a problem that will hopefully be solved by X-ray diffraction in the near future.

It has been shown that there are certainly methods for more objectively identifying surface finishes, a feature that will hopefully be more fully exploited by the archaeologists.

Bibliography: 40 articles.

Beth Revesman

### **A report on the technology, examination and conservation of the wall paintings from Tel el Amarna**

A discussion of the technique of Egyptian wall paintings of the XVIII Dynasty, covering supports, grounds, pigments, media and varnishes, is followed by a description of the methods and materials used in the paintings from Tel el Amarna. The final section deals with the cleaning, consolidation and reconstruction of some fragments of the wall paintings.

Hannele Salmela

### **The metallurgy of some pre-Hispanic Colombian metalwork**

A small but representative collection of fragments of metalwork from Colombia were examined by metallography, atomic absorption spectrometry, X-ray fluorescence analysis, and electron probe microanalysis.

Overall, some thirty fragments were available for study from the regions of Tairona, Muisca, Quimbaya, Sinu, Tolima, Narino and Calima. The results of the analyses showed that most of the material had been made from typical tumbaga alloys consisting of gold intentionally alloyed with copper; there did not appear to be any preferred alloy composition. Silver was also present in small quantities but only one object, from Narino, showed deliberate alloying of copper with silver. The nature of the coloured surfaces of many of the fragments were examined together with possible processes of surface enrichment. The results of this work supported the view that mercury gilding was not employed and that the principal method of surface enrichment was the use of acidic plant juices; silver, if present, remaining alloyed with gold at the surface.

One or two new facets of technological interest were noted; the production of a fusion silver-enriched surface on a fragment from the Tairona district being the most notable.

D. A. Scott

### **A preliminary study of the base designs of mould-blown glass bottles**

The existence of the designs on the bases of mould-blown glass bottles and jars, primarily of the first and second centuries AD, has always been acknowledged but previous research on this subject has been concerned with a few particular designs from a specific country or province. This paper, however, examines the designs that appear on 571 published rectangular bottles and jars from the Western



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Empire incorporating numerous glass manufacturing centres, both known and implied, which can it now seems be identified from such a detailed study of a 'common' glass vessel type.

The main body of the text is a corpus of design types based upon the 571 vessels, these designs being divided into groups when common motifs (eg. three concentric circles, or a cross within a circle) are present, the groups being sub-divided into types when additional elements such as corner dots or central dots are present. This corpus is by no means complete and in many cases only one example of a design can be allocated to a particular type suggesting that future research will add to the number of design types.

The actual function of these designs has long been in doubt, but it is apparent that the greater proportion of the designs were not directly associated with the actual glassmaker or glasshouse but with the purveyor of the vessel (Chapter 1). This being so, the distribution of the design types will show primarily the distribution of the vessels contents and also the influence of the design 'owner' but only indirectly will it show the influence of the glasshouse in which they were made (Chapter 3).

J. D. Shepherd

### **A survey of the prehistoric material from the area north of Cambridge**

The area considered consists of approximately 420 km<sup>2</sup> immediately north of Cambridge. All the sites and finds spots in the survey were gathered together from the Sites and Monuments Record in Cambridge or from local and national journals. They date from the Mesolithic to the Iron Age.

The first half of the paper deals with the soils and drainage of the area. Landscape areas include drained Fenland, Fen Skirtlands, Clay Lowlands and Chalk Uplands. The relief of the area is very subdued and much of the land has been modified over the centuries by various drainage schemes. Because of the highly artificial nature of parts of the landscape, the distribution of soil types was examined to see if this would help to indicate past patterns of exploitation. The information on soils was taken from the Soil Survey's Memoir *The Soils of the District around Cambridge*. From this data the land which, in the ancient landscape, would have tended strongly towards waterlogging was mapped. The area of these 'Ancient Wetlands' was considerably greater than the area of the modern Fen Basin.

The second half of the survey relates the sites and finds spots, period by period, to the Ancient Wetlands and also correlates the number and type of sites with the major soil groups. From these relationships some attempt is made to reconstruct the changes in water levels and land use in the Fens in prehistory.

Valerie Taylor

### **The rise and fall of Sussex churches**

In this project I endeavoured to find out if by looking at churches in a given area it was possible to see the changing fortunes of the people.

In order to do this the churches were defined in terms of their structural status during a series of defined chronological periods. The chronological status periods are based on centuries for ease. The structural status of the building is defined as a number of possibilities which may reveal the economic or population variants within the defined period, for example total rebuilding, major additions or destruction. Each possibility had a symbol which was used to tell the progress of each church in the different centuries and was placed on overlays which could be used either to see the growth, decline and such like of a particular century or the differences between the various centuries. All the overlays related to a base map which had the churches of 1086 in a geographical disposition.

The conclusion arrived at was that it was a possible method to discover the fortunes of an area but it required improvements, such as closer chronological periods and possible tighter definition of the structural status.

Bridget M. C. Todd

### **The Church of St Peter, Bradwell-on-Sea, Essex; an analysis of the surviving fabric**

One of the more neglected aspects of archaeological research has been the study of standing buildings. The church of St Peter, Bradwell-on-Sea, Essex, was one of the Kentish group of early Saxon churches, and much of its original fabric survives in the present chapel. Though the building is of great architectural importance, no detailed record of its fabric had ever been attempted. The main aim of this report was to attempt such a study.

## SUMMARIES OF UNDERGRADUATE REPORTS 1977/78

The external fabric of the chapel was drawn in detail at a scale of 1:20, and a new ground plan of the chapel was made. Research was undertaken in an attempt to find pictorial evidence of the chapel in its earlier phases. This report includes an account of the recording methods and the discussion seeks to bring together all the information in an analysis of the architectural features and fabric of this unique building.

Jane Wadham

### **A study of British cat material from Roman to Medieval times**

In order that skeletal remains may yield more information about the early history of the cat in Britain, the aim is to isolate metrical features of the skull and mandible which could aid distinction between *Felis sylvestris*, the wild cat once found throughout Britain, and *Felis catus* the domestic cat, probably introduced by the Romans from ancestral African wild stock.

Measurement is carried out on three groups of material; (1) Wild cat; (2) Domestic cat, both comprising sexed modern specimens, and (3) Archaeological cat, from sites spanning Roman to medieval periods.

After preliminary statistical testing, the mandible, that area of closely related measurements most likely to show differences between groups is subjected to further analysis, using an SPSS computer programme. This calculates simple statistics (means, etc.) and performs a discriminant analysis, choosing the combination of measurements which best separates groups, and giving each archaeological specimen 'male' or 'female' and 'wild' or 'domestic' labels.

In addition, there is a brief discussion of those non-metrical features which occur most frequently on the skull.

Dorothy Walker

### **Radiographic techniques**

Discussion and illustrations of the type of information which can be obtained from archaeological material, by simple X-radiography, are readily available. There are various radiographic techniques which have been developed to function for specific problems encountered in industrial, general scientific and medical work. The potential use of such techniques in providing for particular demands of objects has received only limited investigation.

In this report the principle of a number of techniques were investigated and their potential use in examination of archaeological objects, particularly for the purpose of conservaton, was studied. The techniques covered were (a) the use of blocking media, (b) tomographic techniques (c) the subtraction technique, and (d) the use of K-edge absorption of X-rays.

The first chapter details the factors which influence the quality of the radiograph produced and how such factors may be altered to produce the most informative result.

Adele St John Wilkes





## Book Reviews

FEACHEM, Richard. *Guide to prehistoric Scotland*, 2nd edn. London, Batsford, 1977. 224 pp., 50 figs. £2.95 paperback.

The second edition of a book which has been widely recommended to evening classes yet for long out of print should be welcomed; it is consequently sad to report that this 'fully revised and updated' version has been but poorly revised and scarcely updated.

The thematic arrangement of the guide is unchanged, with the same headings of Early Settlements, Chambered Tombs, Henge Monuments, Stones and Cairns, Cup and Ring Markings, Homesteads, Hill Forts and Settlements, Brochs, Duns, Pictish Symbol Stones. Within each group the monuments are ordered by county. While this system involves the reader in much page-turning and requires a fair geographical competence, its chief virtue lies in the provision of discrete entries for each site which are readily identifiable on the page.

Those readers familiar with the first edition of fifteen years ago (1963) will find much unchanged. The decision to make no reference in the gazetteer (not even through a concordance) to the new Regional, District and Island authorities will date the second edition rapidly, while the long-defunct Ministry of Works still appears in some entries (p. 198). However, it is the general introduction and the introductions to the various thematic groupings which cause the greatest disappointment.

These short essays, curiously illusive and bland, fail to provide the reader with a critical framework for an approach to and appreciation of the Scottish monuments. In this respect this guide is less satisfactory than Euan MacKie's *Scotland; An Archaeological Guide* (1975), whose introduction does stimulate in the reader an awareness of the biases inherent in archaeological data. In particular, the archaic pottery typologies (figs. 3 and 4), and muddy pot drawings, which do not explain technicalities used in the entries themselves (e.g. Windmill Hill p.70)/Western Neolithic p. 33/Grooved Ware p. 30)/*Terra Sigillata* p. 177) emphasise the rather pedestrian nature of the prehistory retailed.

Two figures have been omitted from this edition; the unsubstantiated reconstruction of the Skara Brae 'lozenge and spiral' sherd and the Burghead rampart drawing. These have been replaced by an over-reduced plan of a Skara Brae house and, confusingly as it is not referred to in the text, a plan and reconstruction of the Knockadoon, Ireland, house (fig. 8), a plan of Dun Skeig (fig. 28) and an aerial view of Traprain Law (fig. 32).

While some of the site entries have been updated to take account of new work, many others have not. Although many of the excavations have not yet been fully published, reference to the interim reports which are available in, among other publications, *Discovery and Excavation in Scotland* would have avoided certain inconsistencies. Mention is made of new work at the forts of Burghead and Craig Phadrich (pp. 138 and 126) and of the excavation of the cairns at Kintraw (p. 71) although MacKie's Thom-inspired work at this site is not detailed (Mackie, E. W., *Scotland: An Archaeological Guide* (1975), 154). By contrast the brief entry for Skara Brae (pp. 28–29) contains no mention of the important excavations of 1972–3 (Clarke, D. V. *The Neolithic village of Skara Brae, Orkney. Excavations 1972–3; an interim report* (1976)); the entry for Ness of Gruting does not quote the radiocarbon date of 1564 bc  $\pm$  120 (BM 441) obtained from the grain cache, which is mentioned (p. 33); the entry for the now rapidly disappearing hillfort of Kaimies, Midlothian (p. 137) and the statement that 'hut circles date from no earlier than the 1st century AD' (p. 95) should be read alongside D. D. A. Simpson's report on his excavations of 1964–68, one result of which was a radiocarbon determination of 1191 bc  $\pm$  90 (GaK 1970) for a wood fragment from hut circle 3 (*Glasgow Archaeological Journal* 1 (1969), 19); while the description of the vitrified fort of Cairnton, Kincardineshire (p. 128) omits mention of LMM Wedderburn's excavations which obtained C-14 dates of 540 bc  $\pm$  95 (N-1376) and 170 bc  $\pm$  100 (N-1316), putatively for the construction and destruction phases ('Excavations at Greencairn, Cairnton of Balbegno', *Dundee Museum and Art Gallery Occasional Papers in Archaeology* 1 (1973)).

Not only are several individual entries out of date, but criticism can also be levelled at the author for failing to make use of many significant papers published since 1963. Two examples must suffice. In describing the ring cairns at Raedykes, Kincardineshire the author states that no information is available about the number and distribution of such monuments (p. 46), thus ignoring Ritchie and MacLaren's seminal paper in *Scottish Archaeological Forum* 4 (1972), 1–17. Secondly, throughout the Guide the author repeats the equation 'Flat Rim Ware equals early Iron Age' despite Coles and Taylor's demonstra-

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tion of this 'ware' as simply the substratum of all bad prehistoric pottery (*Proc. Soc. Antiq. Scot.* 102: (1969-70), 87-100; see also Hedges, J. *Proc. Soc. Antiq. Scot.* 106: (1974-5), 69) for an attempt at a closer dating). Indeed, the General Bibliography is remarkable in its omissions, among which are Scott, J. G., *South West Scotland* (1966); Ritchie, G. & A., *Edinburgh and South East Scotland* (1972); Menzies, G. (ed.) *Who are the Scots?* (1971) and Henderson, I., *The Picts* (1967).

The criticisms voiced above result from a sense of frustration over the incomplete revision which this Guide has received. However, such cavils should not detract altogether from the important function which this book will perform in bringing its readers and users into contact with the field monuments of Scotland, the extent and richness of which might otherwise remain largely unappreciated.

IAN A. G. SHEPHERD

RAHTZ, P. A. and GREENFIELD, E. *Excavations at Chew Valley Lake, Somerset*. (Department of the Environment Archaeological Report No. 8) London, HMSO, 1977. xix + 392 pp., 128 figs., 32 pls. £35.00.

At £35.00 this volume is prohibitively expensive and has clearly been a long time in preparation, although its production is of a uniformly high – even lavish-standard (it does possess an index though none appears in the contents list). Its emergence confirms the deserved reputation of the authors as highly skilled field archaeologists who publish their work with exemplary promptitude. That the appearance of this volume lags behind their manuscript and that its price excludes all but the most affluent institutions is their misfortune for which they can hardly be held liable, save in their choice of publishing medium.

The volume describes emergency excavations conducted in 1953-55 in what is now Chew Valley Lake – a reservoir south of Bristol. The discoveries include a range of sites of many periods and include a Neolithic House, a Bronze Age cremation grave, Iron Age and Roman settlements including a villa, a medieval village with its chapel, millhouse, manor house and peasant cottages a medieval nunnery and manor and some post-medieval buildings. Objects were numerous and included a wooden writing tablet from the villa well bearing a lengthy description in ink.

The concept was praiseworthy and, although nowhere explicitly stated, it was presumably to examine an entire landscape of 1200 acres with a view to determining its settlement patterns from the beginning to the present and to set these against a pattern of environmental, economic and demographic change.

The descriptions of those sites chosen for investigation are excellent and comprise 149 pages of structural description and 167 pages description of the finds, terminating in 16 appendices and an index. There is a brief discussion of geology and topography but none of environmental change whilst the only general statement is a 'historical summary' of 21 pages arranged on a period basis.

The price of obtaining this data could have been anticipated, but this has to be coupled with a feeling of dissatisfaction that a project with so much potential should have culminated solely in a costly statement of data. The conceptual framework for the project and its publication are no doubt products of the climate of thought prevailing at that time. With the benefit of hindsight one would expect such data to be retained as an archive – available on request, with published status confined to the general assessment, which for this project is sadly limited.

G. J. WAINWRIGHT

COLLINS, Desmond. *Early man in West Middlesex*. Contributions by T. J. Allen and R. N. L. B. Hubbard, London, HMSO, 1978. vi + 57 pp., 24 figs. £3.95.

In this book Desmond Collins presents, in the form of tables, drawings (of a high standard), photographs and description, a total of nearly 4,000 artifacts recovered from a series of gravel pits in the area around Yiewsley. This material was collected mainly between 1885 and 1935 by J. Allen Brown and R. Garraway-Rice. Within the sequence of gravel and loam deposits there appear to be trends amongst the archaeological material within which pointed hand-axes become rarer in relation to ovate forms while Levallois material becomes more common. This latter component includes flakes resembling the end products recovered from both Baker's Hole and Crayford, thus suggesting strongly that more than one phase within the development of our Levallois technology is represented within these deposits.

The lowest gravel of all (The Gouldsgreen Gravel) it is claimed may contain, as at Swanscombe, a Clactonian industry but the evidence presented is too slight to support any such assertion. From the topmost deposit (The Stockley Loam) appears to come a series of Mousterian tool forms including 'Bout Coupé' axes. The physical condition of this last group – the 'blue-white series' – appears to confirm the

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details of their typology and stratigraphy in separating them off from the main body of the artifacts recovered. Sandwiched between these two small groups is the bulk of the Acheulean and Levallois material. This patterning it must be stressed is imposed upon material collected up to almost a century ago from geological deposits whose original stratigraphical complexity it is impossible now to assess. It is impossible also now to objectively reassign individual artifacts with any degree of absolute confidence to particular geological deposits or to reconstruct original assemblages of tools. Throughout one must rely on the probability suggested by other single phase sites such as Ilford, Crayford, Baker's Holes, Oldbury, or Cuxton to sort and extract information from what is effectively a mélange of different technological stages and traditions.

Of the general discussion which follows the presentation of the material it cannot be said that Collins' scheme for the British Lower and Middle Palaeolithic carries any more conviction than the sequences proposed by Wymer or the late John Waechter which he sets out to criticise with great severity. Recent work at Hoxne indeed specifically denies Collins' simplistic thesis that there is among our British hand axe material a continuous development within which pointed forms give way to ovate and twisted forms. Equally it seems difficult to support the concept also implicit in the various tables presented that use of a Levallois technology increased smoothly through time. Recent work could be seen rather as suggesting that the Lower and Middle Palaeolithic settlement of Britain was as episodic as that of the Later Pleistocene and that extreme differences not gradual trends are what are to be expected between the technologies characteristic of those various moments of human occupation of the British Isles. Such an extreme of change might perhaps be seen most convincingly in the very different end products aimed at by the craftsmen of the Baker's Hole and Crayford stages of our Levalloisian, whose respective products can be recognised among the material illustrated from Yiewsley.

The volume has an attractive cover which might lead one to suspect that the text is more easily read than it actually is. It is not a popular book, in the market sense of that term, and it might be suggested that the material in it could have been better presented in a learned journal instead of offered, as what the buying public must be led to believe from the cover it might be, namely a popular introduction to the story of Early Man in North West Middlesex.

R. M. JACOBI

PARRINGTON, Michael. *The excavation of an Iron Age settlement, Bronze ring-ditches and Roman features at Ashville Trading Estate, Abingdon (Oxfordshire) 1974-76*. (Oxfordshire Archaeological Unit, Report I). (C.B.A. Research Report 28). London, Oxford Archaeological Reports and Council for British Archaeology, 1978. viii + 139 pp., 84 figs. and maps, 16 pls. £8.00.

The publication of the report on the rescue excavations at Ashville has been completed with commendable speed. Only two years have elapsed between the completion of the excavations and the publication of the report. However, Mr. Parrington cannot be accused of sacrificing detail for speed in his report – the features, pottery and small finds and the plant, molluscan, human and animal remains have all been reported with great thoroughness. Particularly notable among the specialist reports are those on the pottery by C. D. de Roche, the plant remains by Martin Jones and the animal bones by Bob Wilson. In each of these reports, the methods of analysis are clearly defined – essential if the results of the analyses of the material found at this site are to be compared with the results obtained at other sites.

Despite the thoroughness of each individual aspect of the report, and the stated co-operation that existed between the specialists who worked on the material (p. vii), what is very much lacking in the report is a synthesis which draws together the results of the specialist reports and the interpretation of the features. Such a synthesis should give an overall view of the site, its economy and its position within its immediate environment and larger region.

While site reports continue to be a collection of separate specialist reports, however detailed and far reaching they may be individually, an enormous amount of potentially invaluable information will inevitably be lost.

ANNIE GRANT

RAMM, Hermann. *The Parisi*. (Peoples of Roman Britain Series). London, Duckworth, 1978. 159 pp., 49 illus. £3.95.

This fifth volume in the series is about the *Parisi* and deals with Eastern Yorkshire, the area approximately covered by the 'Arras Culture' in the Pre-Roman Iron Age. Mr. Ramm presents a useful and comprehensive synthesis of the area with a strong emphasis on the rural settlement in its geographical context. His approach is successful and his readable style makes this a valuable summary for those



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interested in this area. The only major criticism must be of the quality of the line drawings which is very poor, mainly it appears through the fault of the printers. This renders some of the maps (particularly fig. 4) virtually illegible. This is a great pity in view of the considerable thought which has obviously gone into their content.

Although the content of this volume is good one must query the validity of this approach to Roman Britain. The 'Peoples of Roman Britain' series divides the country into the areas supposedly covered by the various known *civitates*. The best evidence for these is in the south and east where historical sources, epigraphy and Pre-Roman coinage provide some scant evidence. Even in these areas the evidence for anything more than a very general location is at best tenuous. The *civitates* were, as far as we are able to judge, units for the administration of the Province. The use of their names for supposed 'tribes', and any expectation that these should coincide with defined areas of material culture shows a confusion of archaeology, anthropology, history and geography. Let us have good regional studies like this one, but give us regions which make geographical sense so that towns like York (excluded from this study) are considered with the surroundings upon which they must have had some influence. Only when we have a good analyses of artifact distributions through time will we be able to have archaeological regions and these should not then be expected to be synonymous with historically attested political units like the *civitates* or anthropological groups such as 'tribes'.

MARTIN MILLETT

FRERE, S. S. *Britannia: a history of Roman Britain*. Revised edn. London, Routledge and Kegan Paul, 1978. 487 pp., 13 figs., 32 pls. £8.95.

The most recent reissue of Professor Frere's *magnum opus* on Roman Britain has appeared at an opportune moment, for the original hard-back issued in 1967 has long been out of print, and its successor, the Cardinal paperback revised edition (1974) has, in its turn, become increasingly difficult to find since it was reissued in 1977. The new edition is thus most welcome to students and libraries seeking a general text-book on the period.

It is hardly necessary for me to praise the book, for many, if not most of the *illuminati* of Romano-British archaeology have already done so in the national newspapers and learned journals of the late 1960s. When it first came out, *Britannia* rightly received good reviews and since it is still substantially the same, the comments made then still stand. This, however, brings me to the main point of criticism of the present edition, namely the very fact that the book has remained substantially the same through subsequent reissues, has diminished its usefulness. The scholarship and synthesis cannot be faulted, except in terms of its 'feel' (C. E. Stevens *Ant. J.*, 48: 322-3), but the 1978 edition is not up-to-date and represents, at the latest, the position of Romano-British studies in 1974, and for some sections, for instance Chapter 1, appears to give the position held in the early '60s. This is because it is a photographic enlargement and reprint of the paperback with only very minor alterations. The decision to reissue the latter in hard-back form may have been one taken by the publishers in order to satisfy the obvious demand for a good basic synthesis of the period, but the fact that they have issued the book unrevised with scarcely a mention of the fact anywhere in the text does not say much for their publishing policy, and can only reflect adversely on the author.

A. KING

REECE, Richard and CATLING, Christopher. *Cirencester: the development and buildings of a Cotswold town*. (B.A.R. 12) Oxford, British Archaeological Reports, 1975. vi + 78 pp., 11 figs., 9 pls. £1.50.

This book should be read in conjunction with Dr. Reece's paper in a recent volume on the Archaeology of Cirencester<sup>1</sup>. Both take, as their premise, the idea that archaeological evidence is essentially different in character from historical sources and they are written in accordance with a theory of development which ascribes most, if not all, significant demographic changes to economic and geographical causes. Thus the authors do not mention the dramatic events of 1399 when the town was involved in the 'Rebellion of the Earls' while the dissolution of St. Mary's Abbey in 1539 is stated to have made little difference to the life of the average townsman. The reviewer, who was nurtured on the old kind of history complete with its battles, massacres, plagues, religious bigotry and artistic exuberance, cannot help regretting the absence from these pages of an outline political history and so, he suspects, will many other readers. However it is rude and unmannerly when invited to a cocktail party to complain that one has not also been asked to dinner, and much of what we do find in this study is very good indeed.

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Reece and Catling give cogent arguments for the continuity of farming estates from Roman times into the high middle ages and are willing to speculate that St. Lawrence and St. Cecilia may have started life as Roman cemetery churches. Whether or not they are right in either instance is less important than the fact they are posing the right questions. Incidentally could not the early record of the place as a *Villa Regalis* imply some sort of institutional continuity between the dark-age successor of the Roman provincial capital and the Saxon kingdom?

The medieval town was much smaller than its Roman predecessor even when allowance has been made for the latter having been provided with an over-ambitious circuit of walls, but its ecclesiastical buildings including the surviving parish church of St John described by David Verey as 'the largest parish church in Gloucestershire and one of the most spacious in England' prove that it was a borough of substantial importance in its own region.<sup>2</sup>

Most of the buildings in Cirencester, however, are of sixteenth-century date or later and so the pages on the later development of the town are of real value to the visitor. Much of the evidence for its late seventeenth century appearance is to be found in a plate by Kip and so it is a pity that this is not reproduced: it would certainly have been far more informative than the murky plan which appears as fig. 6.

As the title suggests, part of the book is a building survey of the type which is normally prepared by Urban and County Archaeological Units. Reece and Catling prove that such an account can be written on vastly lower financial resources, and their independence of approach allows them to give bad modern development its most thoughtful lashing since David Sturdy's *How to pull a town down*<sup>3</sup>. They suggest that statutory bodies should be able to require owners to preserve ancient buildings in good order: perhaps they do not go far enough for without adequate sanctions (such as confiscation of sites on which buildings have been allowed to decay), the erosion of our heritage will continue.

The survey has, perforce, been limited in large measure to façades (p. 35) and this has its dangers. All too often house-fronts which may be late and of little aesthetic value, mask fine early (even medieval) structures. This will be a matter of no surprise to the trained archaeologist, but planning committees could well base their decisions to retain or condemn a building on apparently well-dated block plans found in this survey as in all the others.

Vernacular architecture is divided into 'Styles' – a useful precedent in any discussion of local building types. Despite the proximity of Cirencester House, the mansion erected by Lord Bathurst, the patron of Alexander Pope, the Classical palladianism of London was a world away from the Cotswold town. This brings me back to my point of departure. Although the typical Cirencester townsman was neither a poet nor a nobleman, the development of any community owes as much to the exceptional individual in its midst as it does to the common man. May I plead with the authors to whom this study was clearly a labour of love to bring out a new edition as quickly as possible, and next time perhaps they will say a little more about the historical development of the town in which they are both lucky enough to live.

The plates are all excellent, but some of the plans (especially fig. 11) should be redrawn in any new edition.

<sup>1</sup> R. Reece, *From Corinon to Cirencester – Models and Misconceptions*, in A. McWhirr, *Studies in the Archaeology and History of Cirencester* B.A.R. 30, 1976, 61–79.

<sup>2</sup> D. Verey, *Gloucestershire: The Cotswolds* (Pevsner's Buildings of England Series), 1970, 161. There is much in Verey's account of the town in general which complements Reece and Catling.

<sup>3</sup> No date (c. 1972).

MARTIN HENIG

YOUNG, C. J. *The Roman pottery industry of the Oxford region*. (B.A.R. 43) Oxford, British Archaeological Reports, 1977. 391 pp., 84 figs. £8.00.

This volume on the Oxfordshire pottery industry covers both the production sites and their setting as well as the products in the overall setting of Roman Britain, the whole volume being summarised by a chapter on the history of the pottery industry. These general chapters are backed up by a mass of detailed information which makes the volume an extremely valuable addition to the literature on pottery in Roman Britain. Most important, from the viewpoint of one who reports on sites where Oxfordshire wares are common, the book is well laid-out: it is easy to find a particular form, to establish its date and to check the references for it where necessary. In the general text Dr Young has succeeded in making a very readable text about the industry which is fully illustrated with distribution maps for all the types. All this makes a volume which is going to be of great use to the student of Roman Britain for many years to come.

The only criticism from this reviewer's viewpoint is the failure to apply quantitative methods to some of the problems raised by this study. This is most obvious in the way Young (pp. 234–5) deals with Fulford and Hodder's hypothesis<sup>1</sup> that water transport was a major factor in the widespread distribution of the fine ware products. Young concludes that water was not a major factor and that the 'predominantly western distribution is far more likely to have resulted from the location of competitors'. This view is



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certainly not unreasonable, but on a question of this type it is possible to go beyond the mere presentation of a reasonable hypothesis. What Fulford and Hodder did was to show quantitatively that the evidence was consistent with an hypothesis of water transport being important. They also showed that the distribution pattern between the Oxford and the New Forest industries was consistent with an hypothesis of competition between these industries. If Young is credibly to refute their hypothesis on the importance of water transport then he must produce his evidence in a similar quantitative way showing that his model is more consistent with the available evidence than theirs.

This is however a very minor criticism in comparison with the scholarship of this important work on which Dr Young is to be congratulated.

MARTIN MILLETT

<sup>1</sup> 'A regression analysis of some late Romano-British pottery: a case study', *Oxoniensia*, 39: 26–33.

TODD, M. (ed.) *Studies in the Romano-British villa*. Leicester, Leicester University Press. 1978. 244 pp., 66 figs. £7.25.

In the preface to Rivet's 1969 compendium on the Romano-British Villa, Sir Ian Richmond opened the papers with the quote, 'Roman Villas are so well established in Romano-British Archaeology as to require paradoxically, some explanation'. This it did provide, and with Todd's comment on p. 9, it is perhaps valid to see this compendium as a complement to the 1969 book, and a barometer measuring the growth of our understanding since then.

First, however, the contents. There are 11 chapters dealing with – emergence of first century Villas in N. Essex (Rodwell), regional studies of Villas in the Verulamium, Nene valley and Hampshire areas (Neal, Wild and Johnston), a detailed appraisal of Winterton (Goodburn), the study of a Villa estate at Godmanchester (Green), regional aspects of winged corridors, and aisled buildings, in Britain (D. J. Smith, and Hadman); villas as a key to social structure (J. T. Smith), Villas and society (Todd), and a study of the Roman and Saxon settlement at Orton Hall farm (Mackreth).

No central theme is apparent, and consequently a reviewer finds it difficult to do equal justice to all of the papers. On the other hand several threads of common concern can be seen in all the papers. Firstly, continuity of the native element – (the groundwork to which was so well treated in 1969, by Bowen) – comparatively late into the Roman period. In Rodwell's paper there is an attempt to differentiate between native and Roman Villas, on the basis of Patera and ewer burials, and a reappraisal of roller stamped flue tiles respectively (1st century AD). Socially, Todd sees the transformation of rigid old Celtic hierarchical system (according to Caesar's account) of Kings, *Equites*, Plebs and other levels, into an initially more fluid system of *Decuriones*, *Coloni* and *servi*. In terms of physical continuity of occupation, Neal and Green give clear examples of what is detectable in purely archaeological terms, although continuity in this, or any period is still a term requiring a lot more qualification.

Secondly, at the other end of the scale, there is the survival and transformation of Villa estates, and occasionally villa buildings, in the late Roman and early Saxon period. In 1969, Rivet could only point towards finer work and clearer understanding, something that from these results, we seem to be closer towards. Green traces the physical survival of the Villa estate into the Saxon period, while Mackreth, in a masterly article investigates the possibility of co-existence of Romano-Britons and Saxons (?Foederati), leading up into Saxon settlement on the site, within Roman confines.

A third trend is regionalism of Villa studies that was only possible in a small way in 1969. While it has its obvious advantages, problems develop in trying to select valid criteria to assess regionalism. Areas like Hampshire, Essex, N. Lincolnshire, the Nene valley and the Verulamium area will exhibit tendencies, but one can't help feeling that apart from the various criteria selected, comparative distributions of pottery, coins and place name survival might have clarified the picture. Physical attributes of the Villa alone (viz. D. J. Smith and Johnstone) will certainly produce patterns of distribution; but what do they represent in real terms to the average Romano-Briton? This seems especially true since villa buildings alone don't fully reflect the status and rank of the *Possessores*, who often had business interests and other property elsewhere.

In these regional studies, the one aspect which seemed, curiously enough, to have been neglected, was the relationship between the town and country – always a possibility when one talks of Villas alone. What was the reason and role for the towns around which the Villas all cluster? What was the relationship between the Nene Valley Villas and the communications (roads and rivers)? In short, one missed



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comment, or perhaps a paper on the role of the villa system – how all of these regions worked within themselves, and within the greater administration.

Nevertheless, on its own grounds the book is a worthwhile complement to the 1969 book, and does add further 'explanation' to the Romano-British Villa. With a valuable series of Villa lists and references, together with an extensive bibliography, this is well worth reading, although perhaps a little expensive at £7.25.

SIMON J. KEAY

MYRES, J. N. L. *A corpus of Anglo-Saxon pottery*. 2 vols. Cambridge, Cambridge University Press, 1978. xxxiv + 358 pp., 369 figs., 3 pls. £62.00.

This work contains the collection of pagan Saxon pottery which has formed the basis for Dr. Myres' research over many years. For the first time it is possible to see the bulk of the four thousand pots known up to about 1970, (before recent excavation doubled the number) illustrated, classified and described. The sheer physical arrangement and correlation of the material alone must have involved much labour, and the result is a monument to the classic tradition of archaeological publication, a major work which it is hoped libraries, if not individuals, will be able to afford to buy.

Some of the pots are here published for the first time, others were previously inadequately illustrated, but some have already recently been published, mostly by Dr. Myres. One can now compare the range of types known from the whole country with the selection found at particular sites, and also compare the English series with those published in Germany and Denmark, the main homelands of the Saxon settlers. Catalogues of material such as this are still as fundamental as excavation reports: refinements of methodology and techniques of analysis are useless without adequate and available data.

Myres' earlier works, especially *Anglo-Saxon Pottery and the Settlement of England* must now be read in conjunction with the *Corpus* which contains not only the latest statement of Myres' thinking but also the material which formed the basis for all his earlier research. It is now possible to consider his interpretation against the background of all, or most, of the evidence he had himself at his disposal instead of relying on the sample selected for illustration in the previous book. This is important, since no independent judgement could until now easily be reached as to the validity of statements concerning the distribution and proportion of different types, nor even as to the inner consistency of the classification.

Perhaps one drawback is the classification. It is based largely on one aspect, the decorations, and relies not on mechanical dissolution into component elements and their combinations but on an intuitive assessment of the totality of the decorative schemes. This is sometimes clear and straightforward but can also be difficult and ambiguous. Someone not familiar with the subject who wished to find parallels for newly excavated pots might find they needed to look at every illustration or else read and absorb all the introductory sections, if not Myres' other works. Some types are almost interchangeable with others – Myres points out that there are many 'hybrids'. In fact, pagan Saxon pottery is not very susceptible to rigid classification – shapes and fabrics are uneven and various and although a surprising degree of order has been brought into the decoration it remains true that no one pot is identical to another, and that a better model than separate classes might be a continuum, with more pots between than within any one grouping. The extraction of workshops on the basis of stamp links is a much more satisfactory basis for arrangement but inevitably this only applies to a minority of the pots. Most of the pots published here derive from old excavations where associated bones, gravegoods and plans are often lacking or inadequate. It can be hoped that in future controlled excavation will produce different kinds of information from patterns of association and distribution within and between individual graves and cemeteries. It must also be pointed out that this is a catalogue of funerary pottery and that in future work on settlement pottery may throw new light on the nature of the early Saxon pottery industry.

Myres himself says that at the end he knew less than the beginning – and perhaps he has not produced so much precise historical information as he himself at one time hoped. But he has at least shown that in this aspect of their material culture Anglo-Saxons in England had widespread and continuing contacts throughout the fifth century, and later, with their homelands around the North Sea which further undermines the idea that the migration was a finite and shortlived event of the middle years of the fifth century. He has also virtually invented the subject: future scholars may disagree with his conclusions and methods but they would probably never have begun research if he had not shown that it was a subject worth studying.

CATHERINE HILLS

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DORNIER, Ann (ed.) *Mercian studies*. Leicester, Leicester University Press, 1977. 254 pp., illus. £6.95.

This volume contains most of the papers given at a conference on Mercia held at Leicester in December 1975. Three papers have not been printed, and it would have been good to know who the defaulters were, and Dr Metcalf has supplied one extra contribution on the circulation of coinage (716-757).

The collection suffers from all the usual ills that conference proceedings are heir to, notably papers which deal with contiguous subjects but fail themselves to fit together, papers which were no doubt interesting and useful at the time of the conference but scarcely deserve the full treatment of printing, and papers which are now aimed at a wide audience even though they must have been pretty turgid going for the experts at the actual event.

As might be expected from the title of the conference, Mercia, the volume shows distressing tendencies to heap together the produce of two distinct disciplines; scarcely surprising then, with the axe-grinding of this reviewer, that some of the papers will be reviewed especially in this, their attitude to History and Archaeology.

With Wendy Davies', 'Annals and the origin of Mercia', I have no fault to find. This is an excellent opening chapter which sticks firmly to political history, and shows how several post-conquest sources can be compared to re-establish an apparently reliable pre-conquest Annal, otherwise unknown. Rosemary Cramp and Hazel Wheeler come in perhaps an intermediate category of Art History, dealing respectively with 'Schools of Mercian sculpture', and 'The Book of Cerne'. I say an intermediate category because their approach is rather different from the archaeologist although they are dealing with material remains. I will probably be branded as a complete Philistine if I say that I would be happier reading their contributions if they, as respected archaeologists both, *had* used archaeological criteria and methods instead of the more vague comparative methods beloved of vague Art Historians. Finally we come down to earth with John Williams who gives us a very good archaeological ration in his 'The early development of the town of Northampton'. His exposition of the facts is clear, we can distinguish fact from fiction (i.e. archaeology from history), and his last page (p. 149) deserves to be made compulsory reading for all students of medieval archaeology.

Three papers by Kirby, Hart, and Phythian Adams deal with Mercia in different historical, textual, and geographical aspects, and there is underlying much of these papers' argument a feeling that the kingdoms, principalities, and even smaller areas known as Anglian or Saxon in the seventh and eighth centuries continue some earlier residue of land-holding and organisation.

I am sorry to take issue with Philip Rahtz and his paper on 'The archaeology of West Mercian Towns', for it is an excellent and up to the minute survey of what archaeology has revealed in modern towns known from historical sources to be important in the kingdom of Mercia. For me, however, he has spoilt it by adding a seasoning of history in the most inappropriate places, such as the consideration of the defences of Hereford. For the moment we know very little about these defences and it must surely only cause problems to throw into any discussion of them a savour of 'possible historical dates'. Let us first establish how many phases of defences there are, then let us get each one dated, or at least let us know the limits within which it must be dated, and only then, when we know that we can give archaeologically different dates to two phases of defences, let us see how this correlates with a completely independently worked out historical sequence. If two phases of defences have to be given the same archaeological date bracket then all the historical dates in the world can be applied to them with equal validity. It may be that phase XV of the defences (post AD 500 but before 1082) is Alfredan, and phase XVI (500 to 1082) is Ethelredan, or it may be that phase XV was constructed in March 902 against a Welsh attack, and phase XVI against an off-course band of Normans bound for Sicily in May 911, neither, of course, recorded.

If I had paid for the book I would reckon my moneysworth lay mainly on p. 149.

RICHARD REECE

CUNLIFFE, Barry. *Hengistbury Head* (Archaeology Site Series). London, Paul Elek, 1978. 95 pp., 35 figs. £5.95 hardback; £4.25 paperback.

This short book must be welcomed partly because it is surprising to find it published at all in such a convenient although expensive form. It is part of a series of 'key archaeological sites . . . in need of reappraisal', and Hengistbury is certainly one of these. Bushe-Fox's site report of 1915 was then in advance of its time in attention to detail and the clarity of presentation; it is to be supplemented, not superseded, by this new volume, which serves as a sort of gloss on Bushe-Fox, bringing his findings up to date. This is done in two ways: the quite substantial body of evidence found since 1915 is incorporated in

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Cunliffe's conclusions, although its presentation is hardly exhaustive and it does not include the results of Peacock's excavations of 1970, to be published separately. Secondly, Cunliffe takes Bushe-Fox's pottery groups to pieces and reassembles them in the light of present knowledge. This section is of the most use to the student, since when Bushe-Fox wrote he had very little comparative material on which to base his findings, whereas today there is much more. Hengistbury's unique nature, however, and the variety of wares found there, still show up the gaps in our knowledge of late La Tène pottery in south-west England and especially in north-west France. The site's importance as an entrepôt of a variety of foreign goods is well emphasised here, since we can now, it seems, trace some of the sources of the items found there, and indeed relate them to the trade in pottery as a concomitant. But there is still, 60 years after Bushe-Fox wrote, no good dating evidence, and none is newly introduced here. The earlier prehistoric evidence, of Palaeolithic and Bronze Age date, is also described.

Cunliffe advertises the unique and exciting nature of this most interesting site with its marvellous position on its windswept promontory, with easy access to the Channel, and views from the Needles right across to Poole harbour and the Isle of Purbeck, and the shelter of Christchurch on the other side of the promontory – no wonder it has such a long history of occupation. Much of it has been eroded even since 1915; and the promontory is an estimated 150 metres narrower than it was in the eighteenth century. Cunliffe writes that the erosion has been greatly slowed by the construction of a breakwater; I hope he's right. Hengistbury deserves better than the swift erosion of one of the most important sites in Iron Age Britain before full-scale modern excavation has been given a chance to sort out its problems and improve our knowledge.

In the chapter on Hengistbury as a port of trade Cunliffe skates smoothly over the wider problems of the first century BC in southern England, and has, of course, an interesting and widespread context in which to place the site, whereas Bushe-Fox had none; perhaps more emphasis on the difficulties of the period still not resolved, especially regarding the 'Belgae', would have been appropriate, but he is quite right to point out the outlines of the 'dramatic invigoration of trade' in the two zones, Hengistbury/Armorica and Essex/Kent/(Hertfordshire)/Belgica that make this century so interesting.

The photographs of the sections of the dyke in fig. 16, enlarged from the original negatives, are much clearer and more useful than in the original publication, and the illustrations are of a generally high standard.

ISOBEL THOMPSON

CUNLIFFE, Barry. *Excavations at Portchester Castle*. Vol. III, Medieval, the Outer Bailey and its Defences. (Reports of the Research Committee of the Society of Antiquaries of London XXIV.) London, Thames and Hudson for the Society of Antiquaries, 1977. viii + 253 pp., 132 figs. 45 pls. £12.00

The third volume of the report on the excavations at Portchester Castle, Hampshire presents all the archaeological evidence relating to the medieval period (1066–1632), including the medieval defences, the excavated area of the outer bailey and the priory.

In the late eleventh and early twelfth centuries, the outer bailey was divided up into plots at right angles to the main east-west road across the interior. There was little evidence of domestic building at this period and the land appears to have been cultivated. Meanwhile the Augustinian priory was founded and built but rapidly abandoned. In the thirteenth and fourteenth centuries, the land along the south side of the road appears to have been built up, with dwellings or sheds. Unfortunately no plans survived in the mass of post-holes. Several fourteenth-century buildings were recovered, including M2 which appears to have been a fairly elaborate structure and which yielded all the medieval imported pottery. After a period of cultivation in the fifteenth century, a large store house was built in the sixteenth century.

The deliberate layout of the outer bailey in the twelfth century perhaps indicates a degree of organisation within the Portchester settlement at a time when, according to documentary sources, it nearly attained borough status. Its failure to do so and its subsequent decline may be attributed to its apparent lack of trade or purely economic reasons for its existence, as opposed to its inflated importance dependent on the value of the castle as a defence at any given period. The apparent lack of trade is emphasised by the very low percentage of imported pottery at Portchester compared to over 30% at Southampton. This must remain speculative, however, until the outer bailey can be seen in context, compared with the castle itself and with the village outside the walls.

HILARY MURRAY



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HUDSON, Kenneth. *Industrial archaeology: a new introduction*. 3rd edn. London, John Baker, 1976. 240 pp., illus. £6.25.

HUDSON, Kenneth. *A pocket book for industrial archaeologists*. London, John Baker, 1976. vii + 134 pp., illus. £2.25.

The first three forceful chapters of the well-established 'Industrial Archaeology' exemplify the sparkle of subject-matter, language and style in both these books.

Concerned, at the outset, with the attitudes to, indeed, the politics of, Industrial Archaeology, the section in the main book introducing a technical archaeologist pursuing industrial archaeology as an academic branch of archaeology, will be of especial interest to students in the latter field. The 'politics' here, receive much better treatment for an important and stimulating aspect than is usually to be expected from industrial archaeology books.

The 'Necessary Minimum of History' is saved somewhat from being a jumble of facts and figures by a provoking question and answer process, and, again, by Kenneth Hudson's flowing style. A small chronology at the end (as in the Pocket Book, p. 113) might have fulfilled this conceded necessity more effectively.

The next five chapters, on the other hand, give a clear and refreshing glance at some industrial highlights, not, fortunately, the usual, rather tedious list of technologies characterising many modern industrial archaeology publications. But, glance as it may be, steam power and locomotion are worth more than a mention and one photograph in an Introduction to a study, despite Mr Hudson's excuse of superfluity, if only for the wide attraction they bring to industrial archaeology (see Pocket Book, p. 29 for example).

As already mentioned, the versatile language/style is a prominent feature. It is warm and conversational, ranging from the idiomatic to the poetic, lacking in scholarly presentation (intentional), but revealing a depth of scholarly thought. It is fiercely heroic in recounting the supporting factors in industrial archaeology (pioneers are called 'crusaders' and even 'evangelists'), and sarcastically scathing about the stumbling blocks.

In addition to the text are some excellently original and fine photographs, few maps and diagrams, but of equal quality, and some very useful general information at the back. A glossary of terms would have been useful for the uninitiated.

The book's title would be verified by the adjective 'British', but its subtitle is still pre-eminently true. The edition's 'humanising' aim is perhaps not quite so well-fulfilled, but still a cut above the rest. Averagely priced for a book of its size, it is very reasonable for its importance and quality.

The Pocket-Book, though perhaps rather wordier in the early sections than the title implies, can be excused this for reiterating the politics and methods of archaeological recording as in the main book and for some new things to say about the law.

The best of the book, true to format, is a mine of listed, easy-to-remember information on museums, organisations and historical 'sign-posts'. The societies section is particularly informative, and it is a pity that the same assessment procedure was not pursued in the museums section.

The price is a little high for a book which is bound to date fairly quickly, but no cause for reticence on the part of the enthusiast.

NICHOLAS DE MATTOS

FENTON, Alexander. *Scottish country life*. Edinburgh, John Donald, 1976, ix + 255 pp., illus. £6.50.

Although its title may suggest a more general subject, this volume is first and foremost an account of Scottish rural working-class life in the 18th and 19th centuries, and of the closely associated economic and social changes which resulted from improvements in agricultural technology during this period. The book's main preoccupation, as with those whose way of life it describes, is food production, but chapters are also included on housing, fuel and transport, and that on 'The Farming Community' deals with such varied topics as dress and the early organisation of trade unions. A chapter on rural crafts such as dyeing, weaving and tanning might have been a further useful addition.

The author reviews the literature on Scottish agricultural methods from the earliest records of the

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late 16th century, and goes on to describe changing methods in the production of cereals, root crops and dairy foods, and in their preparation. Throughout this account there emerges a vivid impression of a tough and hardy people who have been highly successful in adapting their way of life to their environment, whether Highland or Lowland, although it must be said that it is not always altogether clear which area is being described, and some areas such as Orkney and Shetland are given more attention than others.

In the well-documented survival of a pre-industrial subsistence agriculture (into the 18th century in Lowland Scotland, and the 20th century in the Highlands), there is much to interest the archaeologist. The Scottish shieling system, practised in Lewis until this century, provides a first-class opportunity to observe a recent system of transhumance which Mr Fenton believes was an important factor in establishing a permanent settlement pattern. The author rightly emphasises the importance of considering local conditions when making judgments as to the apparent degree of sophistication of tool-types, citing, for example, the *crann-nan-gad*, a primitive but most effective Hebridean plough, and the preference for the scythe over the sickle for cutting cereals in N.E. Scotland. Mr Fenton also produces some valuable documentation on job specialisation and on the organisation of labour in general. There are many useful statistics too; for instance, how many acres the *bandwin*, or shearing team, could cut in a day, how long it took to churn butter by various methods, and what weight could be drawn by a single draught animal on good or bad roads. All this information, and much more, affords rich opportunities for widening the archaeologist's interpretation of his material.

The book is well-produced and is lavishly illustrated with pictures from the country life archive of the National Museum of Scotland, although unfortunately some figures are over-reduced, and the use of upper case letters in the figures to correspond with lower case letters in the legends is confusing. Extensive notes and a very full general bibliography are provided. There is, however, one serious omission, and that is the provision of a glossary. The non-specialist Scot will have difficulty in remembering names of the many specialised tools, and common dialect words such as 'howked' or 'graipe', not explained in the text, may well prove a stumbling block to the non-Scottish specialist.

All in all, however, Mr Fenton is to be congratulated on presenting so much valuable material in such an eminently readable form. The book is excellent value at £6.50 and will appeal to specialist and general readers alike.

FRANCES MCDONALD

LEEKLEY, D. and NOYES, R. *Archaeological Excavations in the Greek Islands*. Noyes Press, Park Ridge, New Jersey, 1975. XIV + 130 pp. \$15.

DAVARAS, C. *Guide to Cretan Antiquities*. Noyes Press, Park Ridge, New Jersey, 1976. XIV + 370 pp. \$18.

Though similar in their arrangement as a series of articles in alphabetical order, these two books from the same press differ profoundly in their aims and in the audience to which they are directed.

*Archaeological Excavations in the Greek Islands* is the first of three volumes intended as aids to the scholar needing quick reference to what work has been carried out on any particular site and where the results have been published. The other two will deal with Southern Greece and Central and Northern Greece respectively. The authors correctly suggest that it will be most useful for its inclusion of details about the many minor sites, the reports on which are not so easily traceable as those on the major ones. They hope to publish a fourth volume with maps showing the position of each site, but have sensibly not held up the publication of the text in order to be able to include them in the relevant sections, since (not surprisingly) they 'have found that the drawing of maps and the precise locating of all these excavations on the maps are tasks which would require so much time as to delay the publication of the first two volumes'.

This volume covers all the Greek islands, with separate sections for each group. A little more than half the volume is naturally enough taken up by excavations in Crete, which is divided into four areas, Eastern, East-Central, West-Central and Western, corresponding to the four *nomoi* of Lasithi, Iraklion, Rhethymnon, and Khania. Considerations of practicality have dictated certain limitations, such as the exclusion of references to chance finds and, more controversially, rescue excavations 'except for the most important'. Post-Roman remains have also been excluded, and also early Christian remains of Roman date.

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With its clear arrangement and relatively large typeface this little work and its successors will undoubtedly be of great use to students of Greek archaeology of the Prehistoric and Classical periods. An index showing which periods are represented at which sites would have made it more useful still.

The *Guide to Cretan Antiquities*, on the other hand, appears to be aimed chiefly at the interested layman and tourist (an index of 'Beautiful Landscapes' is included), though it could also be useful to students. The author is Costis Davaras, who is Ephor of Antiquities in Eastern Crete. While putting the main emphasis on Minoan and Classical times it takes in also the earlier and more recent periods of the island's history. Entries include not only sites, but names of mythological and historical persons (e.g. Eileithyia, Idomeneus, Epimenides, and even El Greco), and subjects (ranging from Archers and Archery through Architecture, Bathrooms, The Cretan School of Painting and Geography to Wheel and Wine, the last two entries). The form allows a great deal of miscellaneous knowledge to be dispensed in an easily assimilable way and by means of asterisks placed after words for which there is a separate entry the reader can meander happily through the mazes of information on all aspects of Cretan history, or follow up any particular line which interests him.

A good selection of illustrations accompanies the text, though the rather flat photolithographic reproduction of the half-tones often leaves a good deal to be desired. An attractive feature is the series of reproductions of Venetian maps of various key areas, which give lively impressions of the 17th century landscape. In a work of this kind it is inevitable that many controversial subjects cannot be adequately discussed, but should it not for instance have been indicated that the identification of *Ahhijava* with the Mycenaeans (p. 1) is disputed, and that the evidence so far for pre-Neolithic inhabitants in Crete (p. 207) is at present extremely tenuous. Other minor criticisms are that the distribution maps which follow the main text appear in a curious order, with one showing 'mountainous areas' (i.e. land over 1000 m – not particularly helpful in forming an idea of the physical geography of the island) sandwiched in among them; that there seems little point in having an Index of Alphabetical Entries when they are arranged alphabetically in the body of the text; and that it is difficult to see the point of printing the proper names among them in capitals. Nevertheless, this is an attractive and informative guide to all aspects of the Cretan past of a kind which has not hitherto been available. It can serve equally for browsing or quick reference, for using at home, or (though it is a little bulky) as an excellent guide book on a visit to the island.

J. D. EVANS

GIMBUTAS, M. (ed.) *Neolithic Macedonia*, as reflected by excavation at Anza, south-east Yugoslavia. (Monumenta Archaeologica I). Los Angeles, University of California Institute of Archaeology, 1976. xxxiii + 470 pp., 30 pls. Price not stated.

The title of this work is misleading, in that the book is not a considered survey of 'Neolithic Macedonia' as a whole, even if the term be restricted to Yugoslav Macedonia, and the name of the site is Anzabegovo. It contains no more than passing reference to well-known sites such as Vršnik, Zelenikovo, or Porodin, and no reference at all to lesser known sites. It is primarily a vehicle for presenting the results of one part of the 1969–70 excavations at Anzabegovo, namely the American half of the joint excavations with the Yugoslavs under Professor M. V. Garašanin, S. Saržoski, and V. Sanev. Nevertheless, Anzabegovo was, and despite everything remains, an important site for the understanding of the south-east European Neolithic, and in particular Macedonia and its relationships with Greece.

The contents are presented in relatively short sections by individual contributors. Two thirds of the book is taken up by the Archaeology, comprising sections on stratigraphy and chronology, an outline of the ceramics and their technology, stone and bone material, figurines, and small finds. This is followed by sections which include studies of the botanical and palaeo-botanical remains by Beug, Grüger, and Mrs Renfrew, of the fauna by Bökönyi, and of the human skeletal material by Nemeskéri and Imre Lengyel (not 'L. Lengyel'). D. Weide has contributed a study of the region's geomorphology and the soils on the site, and in this, as in the other specialist contributions, there are some notable enlargements of our knowledge of the area of the Ovče Polje.

The remains from the site include material with generalised affinities over a wide area: however, the resemblances between the pottery styles of neolithic Macedonia, Greece and south-east Europe do not constitute a means of relative dating. The point is reiterated several times that Anzabegovo is a 'key site' and a 'cultural yardstick', and the assumption made explicit on the first page of the Introduction is that the data from this one site 'could not be otherwise than largely typical of general conditions' in the region as a whole. It is worth examining the sense in which Anzabegovo can be considered a key site, and the ways in which conclusions are drawn from the archaeological material.

As an example of the sort of specific point which any report of an excavation should enable a reader to follow up, we take the important find of a wooden bowl, which probably antedates 5000 bc and was the first artefact to strike your reviewer's attention. It is shown on Plate 35 without cross-reference and



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without a scale (almost none of the Plates have scales), and it is not in the index. There are 60 un-numbered colour frames on a micro-fiche at the end of the book, and from the list of these it is possible to deduce that it belongs to the lowest level (I), from Square II, and therefore not to Anzabegovo Ia since this is not represented in Square II. The bowl is not mentioned in the text of Chapter II/9 among the small finds, or in the stratigraphy of Square II (p. 23). Square II is not shown in position, or at all, on the map figure 5, which is printed upside down, nor can the sections of that square (figs 9a and 9b) be easily related to one another. The wooden bowl is ignored in the discussion of the function of the polished stone tools, the ideal place one would have thought to bring in a mention of evidence from the site itself, considering that reference is made to wooden bowls from Scandinavia and Switzerland. There is a passing reference to the bowl in Beug's chapter on the charcoals, but we do not know what size it is, how it was made, or what its associations are; it is one of the earliest wooden artefacts of this nature from neolithic Europe.

Turning from the attempt to follow up one detail to an assessment of something more fundamental for the general interpretation of the site, we examine the radiocarbon dates. It is a very useful achievement to have series of some 26 dates for this material, or would be if they were not in a most regrettable muddle. The discrepancies between them and the dates already published are too gross to be simply enumerated, but some are tabulated below. It should be noted that the standard deviations also vary, as do, in some cases, the levels to which they are attributed, and there are even mistakes in the simple conversion of BP dates to bc

Level	Lab. No.	Gimbutas 1976, <i>Neolithic Macedonia</i>	<i>J. Field Arch.</i> 1974	<i>Archaeology</i> , 1972
IVb	LJ 2411		4120 $\pm$ 200	= 4250 $\pm$ 200
	LJ 2329	4270 $\pm$ 60 (should be 4280)	= 4340 $\pm$ 80	= 4300 $\pm$ 100
III	LJ 2178	4150 $\pm$ 250	= 5100 $\pm$ 150 (sic)	
	LJ 2185		4560 $\pm$ 100	= 4615 $\pm$ 250
	UCLA 1705b		4590 $\pm$ 120	= 4610 $\pm$ 120
	LJ 2344	4850 $\pm$ 270	= 5050 $\pm$ 300	

(This date is attributed to Level II in 1976 and level III in 1974)

II	LJ 2338	4850 $\pm$ 140	= 4870 $\pm$ 150	
	LJ 2405	4990 $\pm$ 80	= 5050 $\pm$ 85	
	LJ 2337	5130 $\pm$ 60	= 5200 $\pm$ 75	
	LJ 2345	4650 $\pm$ 110 (In <i>Science</i> 1976; 1172 given as = 4590 $\pm$ 120)		

(This date is attributed to level II and III in 1976 and level III in 1974)

Ib	LJ 2351	5090 not 5110		
	LJ 2333 ( <i>Rc.</i> 19/1, 1977 attributes to II.)		4890 $\pm$ 100	= 4930 $\pm$ 250
Ia	LJ 3032	5260 $\pm$ 50	= 5210 $\pm$ 50	
	LJ 2330/31	5220 $\pm$ 60		= 5260 $\pm$ 100
	LJ 2181	5320 $\pm$ 140		= 5390 $\pm$ 250
	LJ 3183	5200 not 5160		

It is also quite extraordinary to find the same laboratory numbers attributed both to Anzabegovo (in Yugoslav Macedonia) and, in other publications of Gimbutas', to Achilleon (in Thessaly), attached to quite explicit stratigraphic labels at sites 150 miles apart.

The labours of specialists such as Suess and Ferguson (*Science* 191, 1976; 1170), to calibrate these dates and the series excavated by Gimbutas from Achilleon (which show a similar series of internal inconsistencies), are quite in vain when the dates, standard deviations or stratigraphy with which they are presented are wrong. Anyone wishing to use this extensive series of samples cannot take them at face value, but will be obliged to check every date, the first requirement for the purpose being a definitive statement, which will no doubt be forthcoming from the excavator. Meanwhile the 'True Historical Ages' which are so extensively used must also be ignored, since Gimbutas shows no awareness of the problems involved in calibration or of the existence of more than one alternative way of approaching it. The

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usefulness of the extensive series of dates from Achilleon and Anzabegovo is much reduced by the sense of unease which comes from not knowing whether any given date is wrong by as much as a thousand years, or not. Not even the graphical representation can be trusted, if one compares Tables 1 and 2 of the article in *J. Field Arch.* 11, 1974.

The extensive use of calibrated dates makes it difficult enough to discuss this chronology in the context of all the other south-east European dates without giving rise to confusion, but the necessity to check every date and the absence of a point of reference against which to do so renders it almost impossible. It is well worth labouring this point, because the only sense that can be made of the archaeological discussion turns on its incorporation in a framework of radiocarbon dating. Moreover these dates cannot be compared with the numerous other dates from south-east Europe until an identical calibration has been carried out on them (not a calibration on any other system). This would be no simple matter even if the system used here had been spelled out, but it has not, and only the sketchiest of references is made to the article by Ferguson and Suess in *Science* 1976, let alone to any of the other extensive literature on calibration.

Finally, what do these dates date? The sole explanation of the system of excavation and registration seems to be the following: 'The American squares were excavated both by arbitrary level and by natural unit according to the demand of soil and features. Provenience is herein indicated by *Square* in Roman numerals, and *Unit* in Arabic numerals' (p. 7). There were 24 excavated squares and four test pits. The stratigraphy of three squares is outlined (p. 19 sqq.) in just under three sides of text, with some profiles, described as 'idealised', of which complaint has already been made above. To reconstruct the associations of the material, pottery, figurines, radiocarbon dates scattered through the rest of the book would be the work of a lifetime.

In the circumstances it does not seem necessary to analyse many of the archaeological conclusions in detail. The section discussing relations to Thessaly assumes a 'migration to the north', but contrives not to mention for example Nea Nikomedeia. Similarities, resemblances, and synchronisms are discussed in the vaguest of terms, while of specific local parallels (such as the pig from Leskovica, 15 miles from the site) there is no mention. Detailed problems such as the secure chronological and contextual placing of the distinctive Macedonian Arcaded Barbotine pottery are not discussed, nor does some of the literature which specifically relates to a whole range of these regional problems appear in the bibliography. It is surprising to read (p. 43) that 'Thus far there are no close analogies . . . either in Greece, Yugoslavia or Bulgaria' for the pottery of Anzabegovo Ib, and that it was 'probably made especially for religious ceremonies' (p. 57). On page 68 Anzabegovo Ia is specifically related to Thessalian Proto-Sesklo as seen at Achilleon, and we read that 'In both regions triangles, curved lines, net patterns and ovals' constitute the motifs, while the account of Achilleon I (*J. Field Arch.* 1, 292) tells us that 'the triangle is the only pattern that has thus far been encountered'. These are in any case red-on-white, not white-on-red. The discussion of relations to Lepenski Vir triumphantly proves that since Lepenski Vir Ia and II are contemporary with Anzabegovo I-II (which are Neolithic) they cannot be Mesolithic (p. 73). (What if reversing that sort of reasoning, Anzabegovo I-II are really Mesolithic?) It goes on to claim that the faunal remains at Lepenski Vir were 'worshipped and sacrificed', and culminates in the difficult operation of the 'sacrifice of large fish'. Fascinated by this we are drawn almost involuntarily to read the section on figurines. Here appear a whole range of characters such as the Bird Goddess, the Snake Goddess, the Great Goddess, the Pregnant Goddess ('although among the Anzabegovo figurines clear images of the Pregnant Goddess have not survived, the worship of this particular goddess is suggested by the sculpture of pigs . . . ' p. 204), and their cults are described (pp. 205, 417) as 'incontestable'.

Although the archaeological sections show no interest in the implications of the fact that Anzabegovo has a sheep/goat economy, these are brought out in Bökönyi's study of the fauna (e.g. p. 319). It is regrettable that the material with which he had to work is clearly an amalgamation of numerous archaeological contexts, but it has been thoroughly described and its comparability to Bökönyi's many other analyses is particularly useful. Schwartz has summarised the fauna of the site of Rug Bajor in the uplands some 12 km N.W. of Anzabegovo, giving a basis for comparison with a partially contemporary site. The studies by Nemeskéri and Lengyel of the skeletons, the several contributions by Weide on geomorphology and climate, and by Beug, Gröger and Jane Renfrew on the palaeo-botany and plant remains, form a valuable contribution in themselves. The pottery, bone and stonework too are given adequate descriptive treatments, among the most coherent being the discussion of the technology of the ceramics by Elizabeth Gardner, and the most inadequate that of the bone tools.

What is so regrettable is that the specialisms have been pressed into the service of a conceptual framework which is inadequate to weld them into a whole, and in this failure we see exposed the question of what is the true role of archaeological scholarship and of the archaeologist. It is one which grant-giving bodies might like to ponder.

JOHN NANDRIS

## BOOK REVIEWS

KALICZ, N. and MAKKAY, J. *Die Linienbandkeramik in der Grossen Ungarischen Tiefebene* (Studia Archaeologica VII). Budapest. Akadémiai Kiadó, 1977. 385 pp., 47 figs., 189 pls., 8 maps. Price not stated.

In this most methodical work of scholarship Kalicz and Makkay make generally available the important Bandkeramik material from eastern Hungary. The book is produced to a high standard, beautifully printed on glazed paper, which shows the impression of real type, as opposed to photographic methods, and the Plates do convey the surface texture of the sherds they illustrate. It will serve to make much more widely known in a coherent form, and in German, material which has hitherto been really familiar only to a rather specialised audience. The importance of the Bandkeramik of the Alföld, the great eastern plain of Hungary drained by the Tisza river, lies in the role it seems to assume as mediator between the earliest farming settlements in Europe, the First Temperate Neolithic sites of south-east Europe with their Greek congeners, and the central European Bandkeramik, in which the mode of behaviour consolidated its hold in Europe. This mediation is both geographical and chronological. The area shows a marked degree of regionalism, in contrast even with other areas within Hungary such as Pannonia, and the many groups concerned have tended to discourage students of the topic. Matters could hardly be more clearly resolved than in this work however, which is not to say that all the archaeological problems have been settled. Work inevitably continues, and there have been developments even since the book went to press, but as an account of what is known it is clear as the type in which it is set.

After an informative discussion of the history of research the book opens with some of the most important material, that of the Szatmár group. The group is named after the county of Szabolcs-Szatmár, a region in the extreme north-east of Hungary. This has intimate links with adjoining areas in Roumania (Satu Mare), and in it we can see the processes of northernmost settlement of the First Temperate Neolithic at work. The material which the authors describe helps to give substance to the Szatmár group, which they originally defined as the earliest stage of the Bandkeramik in the Alföld, but which equally must be regarded as intimately linked to the F.T.N. The most recent researches of Kalicz at Méhtelek, are not included in this book, but they fully confirm this chronological and cultural importance, and the links with Roumanian regions. The group as a whole has as yet rather few sites and only half a dozen are excavated; but the material has generalised resemblances to Körös F.T.N. material, which are most pronounced in the early (Szatmár I) phase, while Szatmár II sites are more similar to Alföld Bandkeramik material. It extends into Slovakia, and one of its features is an intensive use of the obsidian deposits of the area, reflected in the overwhelming proportion of obsidian in the industries of Méhtelek, Ciumești and other sites. That there are more sites now known from the work of our authors, and also that of Korek, than are published here is not a matter for complaint but for congratulation. Radiocarbon puts the early Szatmár group in the first half of the 5th millennium bc, since the book went to press. Like all the other material in this book, the distributions are clearly shown on the maps at the end, and the ceramic material and relationships are illustrated and discussed, including the homotaxial Medina group in Pannonia.

It might have been desirable to include the laboratory numbers and standard deviations in the list of radiocarbon dates. After a short summary the book presents a full catalogue of the sites, amounting to over 550, and a most useful table showing in graphic form what material is represented at each site, followed by well organised apparatus of reference, index, abbreviations, 189 Plates with concordance and list of scales, and fold-out maps in pocket. In a work containing a great deal of cross-reference to individual illustrations, some diagrams summarising the main types and features of the various groups as a whole would have been a good idea.

The treatment is extended to the later developments of the Alföld sites, using the term *sensu lato* since the work effectively deals with the whole of north-eastern Hungary. The very regional distinctiveness of developments here encourages the notion that in due course we can expect to understand the relation to the local Mesolithic, and that this will prove to be an intimate one. With work of this calibre being done in Hungary there is no doubt of results, but this problem is not yet documented by many archaeological finds. The later developments include Tiszadob, Bükk, Szilmeg, Esztár, Szarvas-Érpart and Szakálhát. There is a thorough discussion of the highly important human representations found in some of these groups, of house and settlement remains, and a full schedule and discussion of burials. Then chapters on the chronological relationships, and on the palaeoeconomic information. It is a matter for slight regret that more cannot be said yet about subsistence (pp. 112–3), but few animal bone remains have been studied, and, since the work of Hartyányi and Nováki has shown the plant material from Aggtelek to belong not to the Neolithic but to the Late Bronze or Early Iron Age, there are no relevant plant remains published from north-east Hungary. There is material from the Szatmár site of Méhtelek which may ultimately go towards remedying what is otherwise an unavoidable gap in research.

Nevertheless even here there have been advances in many directions, even in the absence of much direct palaeobotanical evidence (although we do know a few facts, such as that at Dévaványa-Réhelyi we have the earliest six-row barley so far from Hungary, in a Szakálhát context), and there is also some palynological evidence from Hungary which might be taken into account. We know that over 96% of Körös F.T.N. settlements are located in dry forest-steppe zones, and that while a third of Alföld BK sites are in



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the same type of ecological zone, another third lie on the wetter forest margins; while in Transdanubia two thirds lie in the forest zone. These sorts of factors may help to draw together others which underlie the differentiation of these early Bandkeramik and FT.N. groups, and to which Kalicz and Makkay allude, for example the three mesolithic groups which are postulated. These are a western one in Pannonia of epi-gravettian tradition, containing sites such as Szeksard and Hont and moving on to Szödliget; then a 'macrolithic mesolithic' in the north-east, in the Bükk and Zempleni mountains, and around Eger-Köporostető, Ávas and Korlat; and the least known element, the microlithic mesolithic hinted at in the Körös area and around Ciumești in Roumania, surely ultimately connected with south-east European areas of Roumania, and Bulgaria even. There are many problems involved in regarding these as adequately representing the 'mesolithic': some of the sites concerned (e.g. Köporos) are not Holocene, as J. K. Kozłowski has pointed out. These configurations are only hinted at for the time being, but to draw them together we need not only more material published to the standards of this book, but also the incorporation of more environmental and economic data. This will come with time, and at present it is refreshing to have so factual and scholarly an account of the continuing activity of Kalicz and Makkay.

JOHN NANDRIS

THIMME, Jürgen (ed.). *Art and Culture of the Cyclades in the Third Millennium BC*, Chicago and London, University of Chicago Press, 1977. Translator and English editor: Pat Getz-Peziosi. 616 pp., 196 text figs., 5 maps, 581 pls., 7 col pls. \$80.

This is an English translation of *Kunst und Kultur der Kykladeninseln*, the catalogue to an exhibition held at the Badisches Landesmuseum Karlsruhe in 1976. A few additions and corrections have been made to the original, but the format is essentially the same. Few catalogues have been compiled with such thoroughness, and credit must be given to Jürgen Thimme of the Karlsruhe Museum, the general editor and the organiser of the exhibition. Articles by a number of specialist scholars precede the catalogue, providing a broad introduction to the various aspects of the culture. A total of nearly 600 objects were exhibited, virtually all of which are illustrated. The photographs are of a uniformly high standard, informative and arranged to facilitate comparison between objects. Following the plates is a concise reference source for the exhibited items; class of object, provenance, date, material, size, and present whereabouts are supplemented by a description noting parallels and the condition of the object, and an extremely useful bibliography accompanies each entry. The material is drawn from a number of European and American Museums and private collections. The Greek authorities refused permission to borrow objects from, in particular, 'a private collection in Athens'. Presumably this refers to the Goulandris Collection, which provided several photographs for the accompanying text but whose items are not to be found amongst the exhibition entries. The exhibition of the Goulandris Collection of Cycladic Art, held at the Benaki Museum in Athens during the summer of 1978, was, therefore, a welcome complement to that of Karlsruhe. (The collection was published by Christos Doumas, *The N.P. Goulandris Collection of Early Cycladic Art*, 1968.)

Marble figurines constitute the largest class of objects; but clay, stone and metal vessels, tools and jewellery are also well represented, and the inclusion of Early Bronze Age figurines from the Greek Mainland and from Anatolia supplements the Cycladic material by providing contemporary comparisons. A few examples are also included from the neighbouring cultures of Cyprus, Syria, Mesopotamia, Persia and Sardinia, broadening the context still further. Neolithic Greek figurines provide a prelude to those of the Early Cycladic.

Regrettably, few works of the Cyclades in the third millennium are from legitimately excavated contexts; a large proportion were originally bought on the open market and are now in private collections. The inclusion of many of these otherwise inaccessible works makes the catalogue unique – approximately half the exhibited objects were previously unpublished. At the same time, the value of the works for the study of the period is inevitably diminished by their lack of context (and some, at least, may be among the numerous E.C. forgeries). Of, for example, a total of 262 figurines represented, 148 are of unknown provenance and 81 have an attributed provenance; of the remaining 33, only 10 are from recent, controlled excavations. While the catalogue is in itself a model of scholarly dedication, much of the material it presents is thus of limited use to the scholar. Yet without the publication of such works, the corpus of E.C. material would be negligible; and their inclusion in this carefully documented compilation is welcome.

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Several of the figurines are unusual, even unique at present: Nos. 24 and 25 (Neolithic, naturalistic representations of an old woman with a child on her back); Nos. 37, 71 (E.C. I, schematic and Plastiras types); Nos. 153 (male torso), 196, 197, 232 (E.C. II canonical); Nos. 245, 248, 249 (E.C. III, post-canonical). Amongst the stone vessels, Nos. 293, 310, 312, are so far unparalleled, as is the decoration on the pot No. 377. The votive stone legs, Nos. 446 and 447, are of particular interest; said to be from Attica, they are dated to E.C. I-II. Thimme compares the votive limbs of classical and modern Greece, but omits to mention a parallel considerably closer in time – the terracotta votive limbs found at Peak Sanctuaries on Crete in Middle Minoan I (c. 2000 BC).

The Introductory Papers preceding the catalogue (a text of almost 200 pages) were written by a number of international scholars and provide an excellent background to the Early Cycladic culture with a healthy balance of contrary opinions. Colin Renfrew's introductory essay on The Cycladic Culture establishes a framework for the papers which follow. Christos Doumas writes briefly on E.C. architecture and burials. Very few settlements of the period have been excavated and our knowledge of the culture is based largely on burials and grave goods. The new work by Doumas, *Early Bronze Age Burial Habits in the Cyclades* (SIMA, 48, 1977), published since the catalogue, should be added to the bibliography. The paper on Cycladic Religion by Olaf Höckman contains a useful summary of the various opinions regarding the purpose of the marble figurines (cf. Thimme, p. 455–457). But his own conclusions regarding sanctuaries and grave goods are often speculative and at times lack critical logic. The regrettable lack of scientific study on skeletal remains, inevitably leads to classification of male and female graves based on the nature of the grave goods. It is, however, disturbing to see the conventional modern bias that 'jewellery ought to represent the grave goods characteristic of women' (p. 40) perpetuated, particularly as the more detailed figure representations of the succeeding periods show jewellery worn by both sexes. Amongst the essays on figurines, Renfrew provides an authoritative outline to The Typology and Chronology. His original classifications (*AJA*, 73, 1969, 1–32) were based almost entirely on excavated material, thereby establishing a framework through which to view the mass of material published here for the first time, almost all of which lacks a decisive context. Pat Getz-Preziosi's paper on Cycladic Sculptors and their Methods is of particular importance. It is a summary of an unpublished thesis (Harvard 1972) which establishes for the first time that Early Cycladic sculptors used canons of proportion in forming their works. Clear diagrams illustrate the mathematical principles involved, and the hypothesis that devices such as protractor, ruler and compass were used to map out the proportions on the marble prior to carving is put forward. Josef Riederer discusses the progress in the scientific detection of forgeries of marble figurines. Following the order of presentation of the plates in the catalogue, further articles deal with the Early Cycladic stone vases (Getz-Preziosi), clay vessels (John Coleman), metallurgy (Keith Branigan), and jewellery (Efi Sapouna-Sakellarakis). It is particularly useful to have the presentation of stone and pottery vessels in close juxtaposition, for the comparison between shapes is frequently close. A paper by Brinna Otto deals with The Ornamental Motifs of the Cycladic Neolithic and Early Bronze Ages. Unfortunately, the application of descriptive terminology to these motifs can be confusing, and is less effective than diagrams and illustrations. Finally, a selection of papers deal with the connections between the Cyclades and the Greek Mainland (Saul Weinberg), Crete (Ioannis Sakellarakis), the Eastern and Western Mediterranean (Olaf Höckmann). In particular, these essays draw attention to the importance of the Cycladic islands for their economic resources of obsidian and minerals, and their strategic position as stopping points in the crossing of the Aegean sea. The connections between the islands and the Mainland and Crete are based on firm observations; unfortunately, the same is not always true of the so-called 'correspondences' between the Cyclades and the East and West Mediterranean. Many of these are based on superficial similarities, such as the way in which E.B. fortification walls of the Cyclades and Palestine follow the contours of the terrain. Cultural links are sought but geographic similarities ignored: yet surely where the land is flat there is no need to 'follow the contours', and where the land is hilly it is hard to do otherwise. Höckmann's view of communications in the Early Bronze Age forming 'a common Mediterranean culture' (p. 170) is certainly exaggerated. Christos Doumas closes the introductory essays with a very useful paper: An Historical Survey of Early Cycladic Research.

The organisation of this massive book is impressive. The introductory essays relate to the categories represented within the catalogue while further extending the discussion to include cultural connections. These essays, in turn, are correlated with the brief introductions to each of the categories of objects in the comments on the plates (sometimes written by the same authors, otherwise by the editor, Jürgen Thimme). Following the commentaries, the appendices by Thimme discuss eight probable grave groups illustrated by photographs of the respective grave goods. The inclusion of distribution maps is useful, and the indices at the end list both the find-places and the collections to which the objects now belong. An excellent bibliography completes the work. Altogether, this catalogue is a model of its kind. It is an important contribution to the study of the Early Cycladic culture, providing a comprehensive introduction to the student and a wealth of newly published material to the specialist scholar.

LYVIA MORGAN BROWN

## BOOK REVIEWS

WHITE, K. D. *Country life in classical times*. London, Paul Elek, 1977. xix + 138 pp., 34 pls. £6.50.

This book is an anthology of extracts from Greek and Roman texts, illustrating country life in classical times. The introductory chapter by White provides an interesting picture of the relationship between town and country, and draws attention to the importance of the countryside and its agriculture to classical life. It also stresses the rather 'upper class' point of view of most of the authors quoted, and the lack of evidence of the harsh realities of country life. Chapters on different aspects of the country follow, each selection of passages preceded by an introduction. These introductions are, for many chapters, rather too short and leave the reader very much on his own while reading the passages. The book would be of greater value, especially to archaeologists, if more comment were made on the texts, and if an attempt were made to relate the information contained in the texts to archaeological evidence.

According to the author, 'the reader might hope to find among the illustrations a painting, a relief or a mosaic that caught the flavour of a particular passage of the poetry or prose . . .'. However, the number of intended illustrations was reduced by considerations of cost, but less forgivably, no reference is made to the illustrations, except in the final appendix. Perhaps we are meant to make our own comparisons, but reference to the plates, at least in the chapter introductions, would have helped to draw the text and the illustrations closer together.

What is most strongly illustrated in the book is the immutability of human nature. The move to the country by townpeople looking for 'the simple life', the problems of famine and the boys at the seaside playing skimstones are as much a part of our modern world as of the classical world. White's book thus provides very pleasant reading and the passage translations, mostly done by White himself, are lively. Despite a rather meagre index and a bibliography that could have been less select, the book is well produced and reasonably priced.

ANNIE GRANT

COULTON, J. J. *Greek architects at work*. London, Paul Elek, 1977. 196 pp., 73 figs., 11 pls. £7.50.

In this instructive book Dr Coulton has attempted to see the building projects of the ancient Greeks through the eyes of their architects, by getting to grips with the problems both intellectual and physical which they faced in the erection of temples and other structures during the period extending roughly from the early seventh century BC to the first century BC. In the first chapter he discusses the role of the architect, his responsibility for supervision of the work in progress, and his status as skilled master craftsman or thinker. From this he moves on to a description of early temples and considers the origin of the Doric order, calling into question the Vitruvian idea of a timber prototype, and examines the problems of quarrying, transport and lifting of stones, and techniques of measuring and levelling. Design methods are dealt with in turn, the relation between systems of proportion and mathematical notation, the use by Vitruvius of a modular system for the Doric order and a non-modular system in which the dimension of each element is derived directly from that immediately preceding for the Ionic, and later on the use of drawings each receive attention. The implications of scale, the evolution of the various forms of base and capital, and optical corrections are duly considered, and Dr Coulton is able to conclude that after two hundred years of experience, architects had by the third quarter of the fifth century overcome the major problems associated with the Doric temple, although it was not until a further century had elapsed that the first comparable Ionic temple, that of Athena at Priene, was built. The orders, however, were applied to other building types, in particular the stoa, which presented problems additional to those of the temple, especially the internal angle necessitating adjustment of the mutule spacing of the Doric frieze, and other difficulties connected with the desired multi-storeyed façade. Dr Coulton concludes his book with a chapter dealing with the seemingly minor developments in structural technique over the millennium it covers, contrasting this with the highly developed sense of form possessed by the Greek architects, who, on account of their human intelligence, he believes deserve more prominence.

Altogether, Dr Coulton's book, drawing on architectural research of the past two centuries, is most useful and stimulating, providing a concise summary of the scattered information we have on this substantial aspect of Greek culture. His vitally fresh appraisal of this, reflecting in many ways that practical outlook of his eighteenth and nineteenth century precursors, informed by modern scholarship, is greatly to be commended.

IAN BRISTOW



## BOOK REVIEWS

ZOGRAPH, A. N. *Ancient coinage*. 2 vols. (B.A.R. Supplementary Series, 33). Oxford, British Archaeological Reports, 1977. 421 pp., 50 plates. £9.00.

When the devotees of Earth Mysteries have exhausted their stock of erotic explanations for Silbury Hill and Hetty Peglers Tump they may care to turn their attentions to the unsolved mystery of BAR's publication programme. I am not complaining, for I have been fortunate in their attentions, but they do publish some odd things.

The present volume, in two parts, is devoted to a survey of ancient coinage, especially of Greece, the Greek colonies, and Rome, which started life as a series of seminars held in Leningrad in the 1930s. Part I covers the history of coin studies, the production of coins, coin weights and standards, legends and types; Part II gives an interesting and thorough survey of the coins produced up to the fourth century AD around the coasts of the Black Sea.

The work does give a general introduction to coinage in the ancient world, and much of it is a pleasure to read because of the extreme economy of style, the care with which hypothesis and fact are separated, and the way that Zograph so often (as we now know) backed the right horse when an apparently equal chance was open to him. These are strong positive points in favour of this book, but, of course, there are strong points against it. It is the work of the 1930s published in 1977, and there is no escaping the fact that it is forty years out of date. So many dates have changed, so many re-attributions have been made, so many new works published, and so many old notions discounted that the student who takes it as his introduction is going to have to do an awful lot of work to sift the wisdom from the chaff. And if the student was anyway going to read Crawford on the Roman Republic, Kraay or Jenkins on the Greeks, Sutherland on Rome, and Sellwood on coin production, would he really gain much by reading through this?

RICHARD REECE

LIVERSIDGE, J. *Everyday life in the Roman Empire*. London, Batsford, 1976. 222 pp., 105 figs. £3.95

This book sets out to present a picture of everyday life in the different Roman Provinces, a task which the author correctly regards with caution. It is covered in eight chapters, which deal with – the development of towns; examples of towns; home life; education and recreation; industry and natural resources; country life; communications and trade; religion and burial. All of this is within a loose framework of the late first and second centuries AD.

The challenge in attempting to write any book of this kind is twofold. Firstly, within the confines of 222 pages, some aspects of the vast range of subject matter must be oversimplified or omitted. The question is, which ones? In this case, it could be argued that Liversidge is giving us a pedestrian's view of life in the Provinces – hence the preoccupation with domestic affairs and occupations, clothes and various outward aspects of religion. Consequently little *incisive* attention has been paid to explaining how the Provinces worked, the role of the army (a subject which, despite its importance in the romanisation of Provincials, the author almost totally avoids), and so on. Also, in trying to cover so large a spectrum the quality suffers in places; viz. in the case of the Towns after having described August in some detail, the author goes on to describe differences in towns in Germany, Pannonia, the Eastern Provinces and North Africa. It is on such a general level, that some of the more important differences are overlooked.

Secondly, the method used to investigate daily life, is through a purely descriptive material survey of objects, buildings, etc., combined with superficial use of inscriptions and texts. Consequently, there seems no real feeling for the people or their lives. In this respect, it seems a shame that Egypt and its illuminating papyri were a subject that was largely, consciously avoided.

However, taking the book at face value, in providing 'some of the fascination of the subject', and in 'stimulating further study', to the general reader the book is worth reading. It possesses a good series of photographs and plans (some more of which could have been used with effect in the description in the section, p. 65 – on the NE quarter of Volubilis), adequate bibliography, and two appendices. The latter of these would have been a little more useful if all the Provinces had been listed (viz. the omission of Helvetia), and able to be cross-references with a map which marked all of the Provincial capitals.

SIMON J. KEAY

TODD, M. *The walls of Rome*. (Archaeological Sites Series), London, Paul Elek, 1977. 91 pp., 41 figs. £5.25 hardback; £4.20 paperback.

This book deals with the three sets of walls around the city of Rome – the first, Fifth Century Earthwork – the extensive stonebuilt Servian wall (c. 386 BC) – and the great work of Aurelian (and

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subsequent additions by Maxentius and Honorius), a concise survey of which is the heart of the book. Finally there is a general chapter on the history of Roman fortification in the West, which acts as a background for the survey of Aurelian's wall.

This wall was built in the late 3rd century AD, supposedly to protect the city of Rome from the Barbarian threat to which it had nearly succumbed in the reign of Gallienus. The circuit ran some 19 km, comprising at least 18 gates, and 381 towers, was built from the reliable medium of brick faced concrete by the various *Collegia* within the city. Todd's description is clear and lucid, and understandably leans on Richmond's earlier classic work. In the author's own words this is one of his reasons for writing it, and it is done admirably. However, apart from the survey of Western fortifications – which really seems too brief to act as an adequate background for the place of the Aurelian wall (although this is supported by a very extensive bibliography), it seems a shame that the opportunity to ask new questions, or present new arguments, was not taken.

One point that seems worthy of note, is the apparent lack of military expertise and foresight – except in its original conception. This was marked enough for Maxentius, some 20–30 years later, to give it a substantial structural modification, and the addition of a defensive ditch. Given that the progressive threats of Severus, Galerius and Constantine may have been different from that of the Barbarians, military requirements – even to the expense of incredibly small enclosed areas – seem to have been uppermost in the minds of those who supervised the construction of nearly all the town walls in Gaul, and Hispania, etc.

A second, and perhaps more basic point, is the reason for the flourish of these fortifications, most of which were constructed by the end of the 3rd century, and can be found as far apart as Benghazi, Lugo, Verona and Worms, and for some of which (viz. Barcino) Aurelian's wall seems to have acted as an unusually close model. What was the part that they may have played in the newly emergent defensive/administrative structure of the Later Roman Empire?

Nevertheless, the book as it stands is to the point and concise with a series of excellent plans and black and white photographs. It is a very useful aid to student and laymen alike – despite the rather horrendous price of £4.20 for a paperback book.

SIMON J. KEAY

KENT, J. P. C. *Roman coins*. Photographs by Max and Albert Hirmer. London, Thames and Hudson, 1978. 368 pp., 4 maps, illus. £25.00.

In this magnificent book John Kent gives his thoughts on Roman coinage, and comments authoritatively on over 1400 illustrations which are crystal clear enlargements of photographs of a selection of 785 Roman coins. His thoughts take up 62 pages of clearly argued and chronologically presented text, the captions to, and the comments on, the illustrations take up a further 80 pages of text, and, at the end, there are three very useful short sections on Imperial Titles, Roman Emperors from Augustus to Anastasius, and Weights and Metallic Composition. The whole book finishes with a very select bibliography of less than two pages, and an index.

On the general subject of Roman coins Kent says 'the demand for a satisfactory handbook . . . remains unfulfilled. . . certainly it is not the present aim of the author to provide one'. How then does he regard this work? 'Coinages of all ages may inform us on the art, the social and political concepts, the aims and achievements and the economics of the states for which they were produced. None, however, of this potential value can be truly realized unless the coinage is set firmly in its historical context . . .'. I quote at length because it is essential to judge a book such as this on the terms in which it was written. It is the author's personal reflections on an individual selection from the great body of coinage produced by Rome over 800 years. Well, it succeeds.

The person who already knows something about Roman coins will gain a tremendous amount from reading this book and soaking up the pictures. It is, let us not mince matters, a picture book; at least half of the information available must be absorbed by looking hard and long, and with a discerning eye at the pictures. The text will accompany, and sometimes expand on that information, sometimes in a very individual way. Which, being interpreted, means that there are several points both in the general introduction and the captions with which I disagree. But on such a broad canvas the points are not argued in detail, and they cannot therefore be rebutted in detail.

Will the authors and the publishers mind if I say that the person who will get most from the book is the one who wants to get to know something about Roman coins, perhaps the first time that he has taken a serious interest in them? I think not, for the book is the first to present Roman coins as a sequence of objects worth looking at in their own right. The way into this book for anyone, specialist or interested browser, is simply to enjoy it. Then, by reading the painless text, the enjoyment can be broadened if desired. And, red rags which have been put in to provoke various academic bulls aside, it is a book which it is safe to enjoy.

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No one ever seems to believe that a review means what it says unless it contains some criticisms. To reinforce my praise for the book I will therefore pick out some faults. Kent is very attracted to medallions; this is not surprising because they are often examples of the most highly skilled engraving, but occasionally they seem to be there just because they are medallions, and in one case (coin 651) a poorly preserved medallion is illustrated when a simple little bronze coin in good condition would have made exactly the same point, only better. Although the plates are brilliantly clear the numbering is not, and I think the arrangement of the photographs on each plate often leaves a lot to be desired. The plates are designed, which for me is a term of disapproval, meaning that they look aesthetically pleasing, but do not use their layout to make didactic points.

This is not *the* book about Roman coins, as Kent says in his preface, but the next person to use this title is going to have a very hard job indeed to follow it without appearing as a pale imitation.

RICHARD REECE

CARSON, R. A. G. *Principal coins of the Romans*. Part I, The Republic (c. 290–31 BC). London, British Museum Publications, 1978. 88 pp., illus. £15.00.

The new keeper of the Coin Room in the British Museum has taken on the task of summarising the Roman coinage in three volumes of which this is the first. The idea descends from the popular and very useful 'Principal coins of the Greeks' produced in the 1930s, but, as the author says, 'Principal' is now being interpreted in a sense more economic and historical than artistic.

319 coins are selected to tell the story of coinage over 260 years, and each photograph of obverse and reverse is followed by a very brief description and one or two lines of comment. All the photographs are at actual size, so that the student will receive the full impact of the coinage without any barrier of enlargement or reduction.

This is an ideal introduction for the student for he is guided painlessly through what otherwise can be a very off-putting jungle. The fact that the descriptions and comment fall directly under the illustration is absolutely necessary for readers trying to find their way through the Republic, for the coins, at first glance, look very much alike, and it is impossible to keep in mind a whole plate of illustrations when reading a page of prose text. But no doubt this vital facet of the book has contributed to its very high cost.

Criticism of some of the illustrations is possible both in the tone and sometimes the actual orientation of the coins. I cannot take to the tilted heads of nos. 39, and 282, and in the copy to hand some pages seem to be over inked p. 40), while others are uniformly pale (pp. 38–9). These are very minor criticisms. Perhaps a little more substantive are the few occasions when the actual photographs seem indistinct as in nos. 13, 32, 305. To pick on such minor details shows how little there is in the book to criticise, apart from the cost.

RICHARD REECE

BASTIEN, Pierre and METZGER, Catherine. *Le Trésor de Beaurains (dit d'Arras)*. (Mémoires de la Commission Départementale des Monuments Historiques du Pas-de-Calais XVII) (Numismatique Romaine, X). Arras, Commission Départementale des Monuments Historiques de Pas-de-Calais, 1977. 255 pp., illus. F300

Roman Numismatics seems to advance in sudden leaps rather than in the gentle smooth progress usually assigned to scholarship. This study of a famous hoard of gold and silver coins and jewellery is one of those leaps and is compounded of detailed and painstaking work together with excitingly new ideas. Dr Bastien has given us many studies of coinage in the Later Roman Empire before – Bronze coins of Postumus, studies of the mint of Lyon and the mint of London, bronze coins of Magnentius – so it is exactly right that he should now give us the definitive study of what is perhaps the greatest bullion hoard of north west Europe.

This hoard should be immediately recognisable to any Romanist, especially in Britain, as the origin of the 'Arras Medallion' which shows Constantius I reclaiming Britain for the central Empire in 296, welcomed outside turreted gates by the personification of London. This was one of the 40 or so gold medallions and perhaps 600 or 700 coins unearthed together with silver vessels and a candlestick, jewels and ornaments, during digging for clay in the village of Beaurains just outside the town of Arras, on Thursday, September 21st, 1922. After such a detailed beginning a mist descends for the find was left in a bucket in a shed overnight, and much of it has now disappeared. Some remains in the museum at Arras; the British Museum has some coins, the candlestick, and some good jewellery; some is in the collection of the American Numismatic Society in New York – all these are the easy pieces to trace. But besides giving



full details of these pieces Dr Bastien, for the coins, and Mlle Metzger for the jewellery, have traced many pieces now in private collections, many pieces from coin sales, now of unknown whereabouts, and some pieces which were published at the time of the discovery but are now dispersed. Their detective work has led them almost back to the very beginning – 'Nous apprenons en outre que deux aurei et un multiple d'or sont en la possession du fils d'un inventeurs du trésor. Ces monnaies ne peuvent malheureusement être examinées pour le moment.' Such careful research leads Bastien to dismiss as groundless the story, still current, that the workmen melted down most of the gold coins before selling the gold: he suggests, very plausibly, that the men put this rumour about to put the numismatic world off their scent.

This volume therefore contains all the material which may properly be ascribed to the treasure and that gives us 472 coins, the candlestick, and 24 pieces of jewellery. It is a beautifully constructed list with illustrations of nearly every item; but it is much more than a list, for the authors go on to ask what the hoard represents. The clue lies in the detailed study of the coins, for they are overwhelmingly coins known to have been issued for special occasions between 285 and 315. Not only that, but the groups of coins from each occasion are very closely linked by the dies from which they were struck; it is therefore almost certain that these coins have been kept together from the moment that they were handed out as a special donative to an official perhaps in the Imperial entourage. We can therefore go on to plot that official's career from the special occasions on which he was present. He seems to have been with Diocletian in 285, and for the next few years, and then to have moved north to the court of Constantius I. He had a substantial hand-out after the reconquest of Britain (= 59 aurei), more for the Emperors' twentieth anniversary (= 134 aurei), and this is only from an incomplete list.

Throughout most of his discussions Bastien keeps strictly to contemporary sources and even avoids any discussion of the fourth century officials concerned with Imperial donatives, or largesse. He does however quote from the *Scriptores Historiae Augustae*, almost as if he believes them to be writers conversant with the third century, whereas I am as sure as I can be that the milieu in which 'they' are writing is the court of Theodosius. The late fourth century does also bring in two other sources which help us to understand this hoard; the *Notitia Dignitatum* gives us almost an illustrated donative on the title page for the *Comes Sacrarum Largitionum* (Count of the Sacred Largesse), and, bound up with the manuscript of the *Notitia*, the *Anonymus De Rebus Bellicis* fulminates against the harm done to the state by immoderate distribution of largesse. Bastien does mention the *Comes*, but only to point out that his office had not been invented when the Arras, no, we must learn to call it Beaurains Treasure, was buried. The picture page of bags spilling money, golden palm leaves, gold buckles and brooches does provide an interesting point. The jewels of the wife are in the hoard (may we call her Paterna and him Valerianus from the names on a 'wedding ring?'), but there are no official buckles or brooches of the sort so common as marks of rank in the fourth century and beyond. Is this because the belt and brooch were not yet used as signs of rank, or is it because Valerianus held an important and well paid office which had no official rank? He might for instance have been in the Domestic service, and this might have secured for him the golden donatives, but not a belt or brooch of office. This seems a better explanation than the idea that these ornaments were not signs of rank for, to look no further than the Acts of Martyrs from the Diocletianic persecution, several Saints-to-be started off their martyrdom by throwing off their belts of office. But perhaps this is to lay too much stress on what is *not* in the hoard, sufficient to note an interesting absence.

Finally it is possible to add a minor footnote on the subject of largesse and the Empire. This draws together the disparate sources already mentioned, the *Scriptores* and the *Anonymus*. One of the most interesting points of similarity between these two sources is the concern about Imperial largesse. It is a major theme for the *Anonymus*; *repressa largitate*, he exhorts the Emperor, cut down on your Donatives, and the ills of the Empire will be cured. He is worried at the way in which such donatives put into circulation so much purchasing power of gold, and, to him, the circulation of gold is one of the main ways in which the empire can be controlled. Here at Beaurains we can actually see the sort of thing that the *Anonymus* was worried about. One official for one special occasion was getting a gift of well over a pound of gold. Some of that gold came in single aurei, some of it in multiples like the famous medallion. This brings us to the unreliable, and often infuriating, writer of the *Historia Augusta*. This work purports to be a series of Imperial biographies from Hadrian to 284. The first works are quite successful, but after about 217 the author gives up the historical struggle and invents. This, it should be noted is a brief but tendentious summary of one side of a massive argument. One of the writer's favourite emperors is Severus Alexander; in this life he invents liberally, on no subject more than on coins. Alexander is a good emperor because he cuts taxes, and he cut down the size of coins especially gold ones. Former emperors had struck coins which were multiples of aurei and had handed these out in donatives. This was wicked, because it depleted the stocks of gold, and silly, because people only needed gold coins, and if you stuck to singles instead of tens you could cut your outlay on a donative to one tenth. The terms used by the writer (especially *solidi* and *tremisses*) make me quite sure that he is writing in the late fourth century, the same period as the *Anonymus*. He is then writing after many years of major donatives just like those recorded in the pot in the brick-earth at Beaurains. And the famous medallion was the sort of gift which two writers in the late fourth century considered was bringing the Empire to its knees.

The authors deserve the highest praise for their meticulous work in producing a catalogue of the

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highest accuracy under the most difficult conditions. The occasional misprint is there, e.g. E. Strong for D. E. Strong throughout, but is unimportant. The work is absolutely essential for all libraries, and all students of numismatics and the Roman Empire; this is because it is at once the exemplary publication of source material, and a well informed commentary.

RICHARD REECE

NASH, DAPHNE. *Settlement and coinage in Central Gaul c. 200–50 BC*. 2 vols. (B.A.R. Supplementary Series, 39). Oxford, British Archaeological Reports, 1978. 417 pp., 34 pls. £8.50.

This book, based on Dr Nash's doctoral thesis, deals with an area and period of considerable interest both to those interested in Prehistoric and Classical Archaeology. Until recently the difficulties of collecting together information about this period in French archaeology has deterred many of us from looking at it in detail. Dr Nash's book (together with Dr Collis' recent study *B.A.R. S-2*, 1975) thus fills a large gap and as such is very welcome.

The content of the book falls into two distinct, although related parts, one dealing with the definition and chronology of the coin types, and the other examining the settlement pattern and its development through the period from the introduction of coinage to the Caesarian conquest. In many ways it would have made reading easier had there been a clearer distinction in the text between these sections. This does not however detract from the quality of the work as a whole.

The main interest of the book is the convincing way in which numismatic, archaeological and historical evidence is marshalled to establish a chronology for the various coinages. This is developed to give a clear picture of the way that the *civitates* developed under the influence of increased power of the Roman world. This is based on an important model which compares interestingly with information from other societies and other periods.

The sections about the settlement pattern are in many ways less satisfactory, not as a result of Dr Nash's efforts, but as a result of the imperfect state of our knowledge of this area. One looks forward to the day when better evidence is available to build on the firm foundations laid by Dr Nash's study.

MARTIN MILLETT

CLAIRMONT, C. W. *et al. Excavations at Salona, Yugoslavia (1969–1972)*, conducted for the Department of Classics, Douglass College, Rutgers, the State University of New Jersey. Park Ridge, N.J., Noyes Press, 1975 (1976). 236 pp., 60 figs., 64 pls. \$36.00

Among the more attractive hares in the sport of interpreting the subject detail in the spiral frieze of Trajan's Column at Rome, the identity of the harbour city depicted in Scene LXXXVI (Cichorius), from the journey of Trajan to his second Dacian campaign which began at Rome on the 4th June AD 105, has never wanted for pursuers. Among the places which have been canvassed Dyrrhachium (Degrassi and others) is not impossible (although nothing is known of its topography), Byzantium (Benndorf and Niemann) is most improbable, while a suspended judgement (Florescu, Romanelli, Rossi, and others) is perhaps the most prudent. Nevertheless Cichorius's candidate Salona (not surprisingly supported also by F. Bulić and E. Dyggve, both leading archaeologists of Salona) remains the best choice, if only for what seems to be a clear correspondence between the relief and the identified monuments of the city and leaving aside the fact that Salona was a provincial capital and the chief port on the east side of the Adriatic. In the scene Trajan, followed by praetorians carrying their *signa*, disembarks from a ship and approaches the welcoming citizens in front of their city which is represented by its town wall with an arched gateway, behind which lie a portico-like building, a theatre, a tetrastyle temple, and a rather odd structure which appears as a porch with two widely spaced columns. As Professor Clairmont explains in an excursus (pp. 26–35) contained in this report on his excavations in the forum area at Salona, there is now even more archaeological evidence for identifying the city with Salona (notably the juxtaposition of theatre and *capitolium*). As a result it seems likely that Trajan sailed from Ancona across the Adriatic to Iader (Zadar), then perhaps overland via Asseria and Burnum to Scardona where he took ship again for Salona, from which the main journey inland commenced.

Archaeological investigations among the ruins of Salona (mod. Solin near Split) have revealed much of the Christian city (notably the churches inside the walls, and the *martyria* at Manastirine, Kapljuč and Marusinac in the suburbs), but also the amphitheatre, the theatre and an associated classical temple. Many problems are yet to be answered in the evolution of the city defences, formed by two contiguous enclosures, linked by the impressive gate (the so-called porta Caesarea) built originally under Augustus



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(H. Kähler, *Vjesnik arh. i hist. Dalm.* LI (1930–4), 1940, pp. 1–47) which leads from the earlier western enclosure to the later eastern enclosure, where at least part of the defences were built by the Roman army in AD 170 (*ILS* 2287). Within the earlier western enclosure excavations on the site of the forum have either been imperfectly published (e.g. Dyggve's summary report of the temple found east of the theatre, *Rev. Arch.* ser 6, 1, 1933, 41–57) or as yet not all (For the excavations in the forum area by L. Crema in 1942–3, see E. Ceci, *I monumenti pagani di Salona*, Milan 1962, p. 138 with plate XVIII). Things have now taken very much a turn for the better through the publication of the report on excavations by Professor C. W. Clairmont and his colleagues in the forum area during 1969 and 1970, a speedy completion which it is hoped may serve as both model and inspiration for other recent excavators of Salona. This new volume is valuable for the careful and detailed account of the excavations and the structures which they revealed but even more for the admirable chapters on the small finds (by Clairmont, Victorine von Gonzenbach and Susan Handler Auth). Annotated and illustrated catalogues of the finds are related to the standard collections and studies available for the Greco-Roman world, and furnish the first interpretations of sealed deposits linked to a stratified sequence so far available for Roman Dalmatia. For this alone the excavators and their institutional sponsors are entitled to congratulations, and there can be no doubt that the latter's money has been well spent. The volume has been produced in a workmanlike rather than lavish fashion and this must have served to allow the price of \$36, which is still rather high for a volume of less than three hundred pages, no glossy paper, and no large pull-out diagrams. The rather poor reproduction of some of the detailed excavation photographs for chapter III (pp. 38–79) appears to be a direct result of the economy in production.

The first detailed record of Salona is to be found in Caesar's Civil War, where the site occupied by a 'community of Roman citizens' (*conventus civium Romanorum*) is described as 'protected by the nature of its situation and by a hill' (B.C. iii. 9: *est autem oppidum et loci natura et colle munitum*). It now emerges that this eminence can now be recognized on the ground, much less prominent than in Roman times but still clearly discernable in the southern part of the western 'urbs vetus'. Its southern slope was such as to be suitable as a natural setting for the *cavea* of the Roman theatre, while what has long been a puzzling row of six (originally twelve) arcades running from east to west (p. 12 fig. 1) represents a platform (65 by 45 m) extending southwards and later occupied by the forum of the Roman colony. It seems reasonable to accept the identification of the temple with three chambers described by Dyggve as the *capitolium* of the *colonia* with its three *cellae*. The recent excavations have revealed the details of a building which can reasonably be identified as the *curia*, the meeting place of the local city council, on the east of the forum area (pp. 45–51) from the long known fragment of an inscription which mentions the building by name (CIL III 8817: *curiam inc[hoatam?]/sua pecunia [estituit]*), and whose lettering may be dated to the first century AD (p. 50 fig. 24). In the 'forum north' site what may have been the east enclosure wall of the Hellenistic settlement was adapted to serve as the enclosure wall of the first century AD forum (p. 67–79). Unlike at the Augustan colony Iader (Zadar), where a double precinct forum and capitolium occupied the central block at the centre of an orthogonal street plan of *cardines* and *decumani*, the less regular arrangement of the Salona forum, *capitolium* and *curia*, that may now be reconstructed from the excavations of Professor Clairmont and his colleagues (see pl. 7 and pl. 6 for its position in a general plan of the city) may reflect the vitality of a city that grew up naturally through advantages of position and communications where, while the colonial territory was surveyed into *centuriae*, the centre of the city was never accorded the grand architectural treatment and overall planning that is a feature of other Augustan *coloniae*. Apart from the buildings the remains of a furnace for iron smelting later adapted to serve a glass-making process, for which a tank to prepare and melt glass batch had been prepared (pp. 56–63), in which process was evidently used the small balls of cobalt (1.5–3 cm in diameter) for colouring, rather than for preparation of the frescoes which were later applied to the walls of the *curia* (in period II), which are examined in great detail by Clairmont (ch. IV, p. 105–30). It is hard not to be somewhat disturbed by the notion of formal business in the *curia* with an iron smelting furnace working a matter of yards away. At least this may be accepted as a healthy corrective to the more idealised reconstructions of public life in Roman provincial cities.

J. J. WILKES

KRASKOVSKA, Ludmilla. *The Roman cemetery at Gerulata Rusovce, Czechoslovakia*. (B.A.R. Supplementary Series, 10). Oxford, British Archaeological Reports, 1976. 82 pp., 91 pls. £2.50

This is a report on the excavation of 167 provincial Roman graves belonging to a cemetery at *Gerulata*, a frontier establishment in that small part of Czechoslovakia which lies within the Roman Empire. About half the graves were cremations, and, apart from a few possible cenotaphs, the rest were inhumations. The cremations were mostly in simple pits without containers, but sometimes with grave-goods; these, where datable, were second century. An interesting feature on the edge of the cemetery was a possible *ustrina*. The inhumations were of two types: one with the heads to the south-east and furnished



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most notably with hobnailed shoes; the other with heads to the north-west, whose furniture included cross-bow brooches and whose layout was in all respects typical of late Roman inhumations in nearby Hungary. Graves of this second type were certainly fourth century, but the first type could be earlier. Also, as the author points out, this type could represent a distinct ethnic entity. All in all there was clearly much information of interest in the *Gerulata* cemetery, most of which is adequately conveyed by this report, despite the latter's regrettably poor presentation.

GILES CLARKE

KASCHAU, Bernd. *Der Runde Berg bei Urach II: Die Drehschreibenkeramik aus den Plangrabungen 1967-72*. Simeringen, Jan Thorbecke Verlag, 1976. 78 pp., illus. Price not stated.

This is a report on the wheelthrown pottery excavated on the Runde Berg near Urach some 40 km south south-east of Stuttgart, and therefore in the area of Germany outside the control of the later Roman empire. The total number of sherds accounted for is 12,021. These are divided up into 16 groups according to fabric and date, and illustrated with 574 excellent drawings and 12 perfectly clear half-tone plates which give a strong feel of the pottery. 19 tables break the groups down into forms and 18 distribution plans give the occurrence of the main groups and forms over the site.

In chronological order the groups comprise late Roman wares, mainly from the region of Mayen, and therefore containing the volcanic inclusions typical of the Eifelkeramik (groups 1-4), carinated bowls and beakers with bands of lattice decoration (group 6), quartz tempered jars and bowls which are probably locally produced post-Roman wares (groups 5, 8-9), a pimply Carolingian ware (group 13) and a finely made, well levigated, hard fired late medieval ware (groups 14-16).

To an English eye it is very pleasing to see a report which deals equally carefully and thoroughly with pottery from the large late Roman factories, local wares of the 5th-6th centuries, Carolingian wares, and late medieval products. It is luxurious to have the full descriptions and discussion of each ware backed up and expanded by photographs and maps showing other find spots, and therefore probable centres of production.

Group 6, the carinated vessels with lattice decoration, is given special treatment, as might be expected in a volume of the Kommission für Alemannische Altertumskunde, as this is the best candidate for the basic local Alemannic pottery of the 5th-6th centuries. The contrast between the bowls (Fig. 7) and the jugs with handles (Fig. 9) on the one hand, spreading east from Urach, and the beakers spreading north (Fig. 8), is fascinating. The dating for these forms comes mainly from associated brooches in graves, and therefore seems secure. The attribution to the Alemanni is not a matter for me to comment on, but this type of pottery is certainly shown to belong to a group of people living along the Rhine and the Danube in the fifth and sixth centuries.

The only part of the report which made less impression on me than it might have done was the series of distribution plans in which the find-spots of most of the main pottery forms were plotted. Some distributions, such as Group 14 clustered at the north-east end of the large central building, are obvious; in other plans the distributions of different types is so similar that what we need is not an absolute distribution plan, but a relative distribution plan to pin-point areas with (a) above average pottery concentration, and (b) above average pottery distribution for that type. This is a general failing in distribution studies, not a particular failing of this report.

In many cases the problems of constructing pottery reports for English sites are very different from the problems encountered at the Runde Berg; two things that English pottery reporters could copy with great advantage are the clarity and simplicity of this report.

RICHARD REECE

SJØVOLD, Thorleif. *The Iron Age settlement of Arctic Norway*. (Tromsø Museums Skrifter, X.2.) Oslo, Norwegian Universities Press, 1974. 392 pp., 22 figs., 76 pls. Price not stated.

Unfortunately the first volume of Thorleif Sjøvold's catalogue of north-Norwegian Iron Age material, which covers the Roman and Migration periods, is less well known than it deserves to be, owing to a shipwreck in which a large number of copies were lost. One hopes that this, the second volume, will fare better. It catalogues 737 finds of the Merovingian and Viking periods in the museums of Tromsø and Trondheim. As was pointed out in volume I, grave goods do not constitute an ideal basis for the study of the scope and character of settlement. On the other hand, aware of the pitfalls and shortcomings, Sjøvold shows what can result from the cataloguing and analysis of unpromising material, mainly chance finds and for the most part ill-recorded. Fewer finds from the 7th century reflect not a smaller population, but a brief fashion for flat-topped graves instead of burial mounds. Much systematic surveying remains to be done before a map of Iron Age remains in northern Norway ceases to be misleading. Preparation of this

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catalogue has served to confirm Sjøvold's view that the Iron Age in Arctic Norway was the result of immigration during the 4th, 5th and perhaps 6th centuries. The immigrants most probably came from Rogaland. An interesting observation is made on the correlation between the extension of Early Iron Age settlement and the northern limits of regular cereal-growing. The plates are good and for the most part are of objects not previously illustrated.

VALERIE FENWICK

BARLEY, M. W. (ed.). *European towns: their archaeology and early history*. London, Academic Press for the Council for British Archaeology, 1977. 523 pp., illus. £24.00.

This volume records the papers given at a conference on European towns in Oxford at Easter 1975. The conference was extremely expensive; it was therefore attended by speakers and town dignitaries, and there is no sign of any discussion or inspiration in the proceedings. Hardly surprising. The editor has remained in low profile – a fact of which I strongly approve – having limited himself to ensuring the accurate and reliable transmission of texts. He is, however, responsible for encapsulating a major defect of the conference, preface p. ix, 'The papers on the north and east European towns best reflect the way in which archaeology can complement and enlarge the evidence of the documents'. Archaeology is apparently still not grown up; the hand-maid of history needs liberating.

The major part of the volume (pp. 1–288) is devoted to country surveys, then follow groups of papers on the origins of towns (293–414) and towns as political and religious centres (419–509). The quality varies dramatically in each section but is most obvious in the country surveys. No doubt there was a brief to which to work, but this is no excuse, it should have been torn up and thrown away. The British contributors have not done this and their contributions are consequently uninspiring. Tom Hassall, one of the most lively town archaeologists, plods through an opening chapter of facts and figures, mostly now out of date, vigorously suppressing all the ideas that I know he has. The result is offputting. Gradually we rise through earnest accounts of Scotland, Wales, Ireland, and Scandinavia till at last Lobbedey for North Germany takes wing and gives a stimulating and personal account. Disaster falls on France – why, when M. de Bouârd is such a brilliant speaker and lecturer, so devoted to medieval archaeology? This chapter is inexplicably dull, uninformative, and has serious omissions. Böhner on the Frankish kingdom is excellent, Sarfatij on the Netherlands is good, and a brilliant, but diverse trio ends the section. Mannoni and Poleggi bring some Latin polemic, politics, and emotion into their account of North Italy, Herrmann is very lively on East Germany, and Vetter did tear up his instructions. He tells us what *he* wants to say about Austria and the 'Legal bases for (Austrian) archaeology' are pushed into an appendix, to which everyone else ought to have had the guts to consign them.

The second part contains essays on continuity, to which I shall return, New Sites, mainly confined to North and East Europe from the 8th century onwards, political centres – in which a good summary of Hungary seems out of place – and ecclesiastical centres with a wide ranging essay from C. N. L. Brooke and a paper on York and Canterbury (an interesting order) by Peter Addyman which contains some strange archaeological and historical contradictions.

From all this it emerges that there are two interesting questions about towns in Europe. One question concerns the possibility of continuity from the 5th to the 8th centuries, the other concerns the way in which the towns of the early middle ages came into existence. Boggled down and befogged by historians it is not surprising that the conference did not come to any original conclusions, but the complete absence of any constructive discussion when such a galaxy was assembled – or the inability to print any – is a chronic failure. We have to make do with only three or four thoughtful papers. Fevrier, as one might expect, is extremely thoughtful, so much so that he touches on almost every possible aspect of towns in language so seductive that the reader is lulled into a false sense of insecurity. Do not worry, he is a Romanist at heart, and he does in fact know the accepted canon of what happened even if, for the moment he is being open-minded. Vetter on Austria gives considerable general food for thought as he catalogues population movements, the establishment of the Christian church, survival of place names and institutions to a differing extent in the east and west of Austria; here we have material to work on.

The duo of David Hill and Edith Wightman is an unlikely combination in one way, but it is the absolute kernel of the book. If only these two papers had been circulated before the conference and every relevant contributor had been battered into organising his paper according to their insights the subject would have leapt forward by fifty years. Both ask – What is continuity? and – Continuity of What? Hill cuts clearly and cleanly through the rubbishy sub-Roman undergrowth that has bedevilled British archaeology to state firmly that Roman towns in Britain were dead long before any Saxon towns began. In North East Gaul Wightman cannot be quite so categorical because her evidence is so much more varied, detailed, and informative. Different aspects of urban centres sank to different nadirs at different times. She has to admit to a complete archaeological blank for the late fifth century – so far as organised town life is concerned – yet some towns appear to continue into the sixth century. But, she asks, again hitting a vital spot, is the

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continuity of occupation in town sites really continuity of town life? Finally, her most original question is one which ought to shatter the complacent world of outward forms and labelled categories in which we all live: is the growth of urbanism in North West Europe something which developed slowly in the first millennium AD in response to a gradual change in the countryside, into which Roman towns obtruded – born out of due season – and then collapsed, so that the idea of urban settlements started again and survived when the countryside was ready for them? Of course the answer is YES.

The answer to the question lies dormant on page after page of this large, and useful book. In Wales and Ireland, Denmark and East Germany, again and again, the point is made that during the period of Roman expansion the idea of the town was freely available in Europe: available, but irrelevant. To Edith Wightman belongs the honour of describing the conceptual fulcrum on which town studies are balanced. With a good shove we can change course from a dull catalogue of urban excavations and the mindless slogan 'Every town should have one', to the pursuit of wider ideas.

RICHARD REECE

BOWEN, E. G. *Saints, seaways and settlements*. Revised edn. Cardiff, University of Wales Press, 1977. 245 pp., illus. £3.90.

To an archaeologist this book is misleading and misguided. I come to the 'revised' edition not having read either the edition of 1969, or the reviews of it. This may be unwise, but my objections which follow are, for me, original, though they may well have been expressed by others before.

It is a book by a historical geographer about a historical period, about culture areas and routes of travel in the period of roughly AD 400 to 1000, so does it matter that an archaeologist finds it acutely uncomfortable reading. Unfortunately there is a considerable archaeological content in the layout and reasoning of the book, and if the archaeologist fails this leaves severe holes in the arguments presented. The archaeology does indeed often fail.

Confidence is not inspired by the number of footnotes which refer to articles and books now thirty or more years old. Much written between 1930 and 1955 was excellent, but much of it is out of date, and the references I noticed are mainly out of date. By concentrating on earlier works the author has missed a lot that would in fact have helped his case. While the subject of pottery imported from the Mediterranean and France in the 5th–8th centuries is a useful building block in the construct of Western trade, the references quoted were outmoded even in 1969. Oval or circular huts at Nendrum cannot be like those at Iona; there are none (p. 194). The fact that the British migration to Brittany in the 5th–8th centuries has left 'no archaeological evidence whatever' (p. 161) completely misses the fact that we can define neither the Breton nor the Briton archaeologically in the immediate post-Roman period. And so a list of archaeological criticisms could go on.

Bowen emphasises that as a historical geographer he is not tied to chronology like the historian, or to artifacts like the archaeologist, but is free to concentrate on distributions and what they show about the homogeneity of certain areas at different times. This is stated quite clearly when he takes Owen Chadwick to task for dismissing the distributions of dedications to St David as a medieval phenomenon due to the policy of the Cathedral church imposed on its diocese rather than as a reflection of 6th–8th century groupings. Bowen's point is that whenever a group of dedications to St David arise that grouping in itself is interesting, and when it arises in a similar area to that in which St David himself is supposed to have lived and worked, even more interesting. But this is the limit of the method.

Chadwick as a historian has the chance to explain how two sets of distributions come to be and the opportunity to show social forces at work and similarities or differences of the action and interaction of human beings. Bowen as a distributionist has only the chance of saying 'look, two distributions, how interesting'. Yes, his distributions are interesting, if he had left things there all might have been well. But he has been tempted to go on, and has had to drag in other disciplines, notably archaeology, to help him explain the distributions. It is at this point that things go wrong.

RICHARD REECE

GREEN, Jeremy N. (ed.). *The Jacht Vergulde Draeck*. 2 vols. (B.A.R. Supplementary Series 36). Oxford, British Archaeological Reports, 1977. 507 pp., 115 illus. £10.00.

The continuing publication crisis in archaeology has had particularly severe consequences for the new subdiscipline of maritime archaeology, since it has proved hard to demonstrate the scope and potential of the field in the absence of a corpus of definitive site reports. Furthermore, those few reports which have been produced have been concerned with classical or pre-classical sites in the Mediterranean.



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The appearance in these volumes of the first substantial report on a post-medieval wreck-site is therefore doubly welcome, quite apart from its intrinsic merits, which are in fact considerable.

The first part, contributed by the Dutch historian Lous Zuiderbaan, consists of a straightforward account of the historical background, firmly focused on the particular ship herself, and avoiding the temptation to digress into wider, but irrelevant, historical topics, a fault common to many reports of work on post-1500 wreck-sites. The second part, mostly from the pen of Jeremy Green, the dynamic curator of maritime archaeology at the Western Australian Museum, discusses the work on the site since its rediscovery in 1963, including a useful summary of how events on this site stimulated comprehensive laws concerning maritime archaeology from the Western Australian Parliament, and explicitly stating the necessity for such legislation in all countries. In discussing site operations, Mr Green vividly describes the difficulties faced, but without false heroics, and attempts an honest assessment of his team's failings. Another commendable feature is the brief, but thoughtful, consideration of the significance of the artefact patterning on site, presented alongside a series of distribution maps.

The heart of the report, occupying over half its length, is the catalogue of finds, describing a dated assemblage which will remain an essential reference for post-medieval archaeologists in every Continent. This is organised according to material types, a much more logical and unambiguous procedure than the recently-fashionable practice of trying to classify objects according to ship-board use, with all the arbitrary assignments and unjustified assumptions that implies. Although only an interim statement, pending the study of the larger collection from the wreck of the *Batavia* (1629), the description of the stonewares is of particular value, as is also the coin catalogue (by Mr S. J. Wilson), summarising the 19,100 pieces from the wreck known to the Museum. The text is liberally illustrated with excellent line-drawings. Finally, there is a useful tabular summary, based on archival sources, of the equipment, stores, and requisitioned cargo likely to have been on a ship such as the *Vergulde Draeck*, for comparison with the excavated material.

One major criticism to be made of this publication is the inclusion, as Appendix 1, of a paper by Robert Sténuit on the wreck of the *Lastdrager* (1652), which appeared four years ago in identical form in the *International Journal of Nautical Archaeology*, and which is not of the same calibre as the main report. Otherwise, a minor criticism can be directed at the photographs, where the success attained in procuring clear and informative originals (especially in adverse conditions underwater) has been squandered through the reproductive methods used by *British Archaeological Reports*. It is also annoying to find several important works cited in the text, but not included in the reference list.

With uniquely favourable legal, political, and financial support, and a well-staffed research unit, it is not surprising that Jeremy Green has been able to produce this excellent and informative report within a reasonable time; nevertheless, good use has been made of these resources. It represents a powerful argument for the provision of similar facilities elsewhere, above all in Britain.

KEITH MUCKELROY

MEGAW, J. V. S. (ed.). *To illustrate the monuments: Essays on Archaeology presented to Stuart Piggott on the occasion of his sixty-fifth birthday*. London. Thames & Hudson, 1976. 332 pp. £15.00.

The custom of honouring a senior scholar by presenting him with a volume of essays specially written for him has come in for a good deal of obloquy in recent years. It is expensive to publish, the quality of the contributions is bound to be uneven, and those which do contain important material are liable to get lost, buried as they are in a heap of miscellaneous offerings drawn together for an ephemeral occasion. But though there is obviously a good deal of justice in these criticisms, the *Festschrift* industry is nevertheless booming, and it is now no great novelty for more than one to be produced for the same person.

This is in fact the second volume to be offered to Stuart Piggott, the first, *Studies in Ancient Europe*, having been published as long ago as 1968. The present volume is, however, by no means a repeat, or a continuation of the first. In that instance the contributors were chiefly his students; here they are colleagues from a number of countries, and the geographical range of the essays themselves is wider, though the emphasis is naturally still on European prehistory. The subjects of the individual essays are, as they generally are in similar collections, very diverse and linked only by the relation of almost all of them to some particular facet of the dedicatee's interests. The illustration of monuments, in the literal sense, is dealt with by only one of them, an interesting essay by Seton Lloyd, based on his own lifetime of experience in that field, and very appropriate for the purpose. Of the remaining thirty-three pieces, relatively few are about monuments at all directly, though all may be embraced by the broad sense in which 'illustrating the monuments' is evidently to be taken in the quotation from Stukeley which furnished the idea for the book's title.

Many of the best contributions are straightforward studies or reappraisals of an archaeological site, period or problem, such as Ida Bognár-Kutzián on *The Origins of Early Copper Processing in Europe* or Antonio Arribas on *A New Basis for the Study of the Eneolithic and Bronze Age in Spain*. Among these

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studies one of the most original is that of the late and much lamented Paul Johnstone, a comparison of the woodworking techniques of wheelwrights and shipwrights in the ancient world. Glyn Daniel and Ole Klindt-Jensen deal with aspects of the history of archaeology, while Richard Atkinson combines history and monuments in a piece on *Lukis, Dryden and the Carnac Megaliths*. Naturally enough the Celts figure, directly or indirectly, in a number of contributions; the Druids, as the inspirers of 18th and 19th century Druidic follies, are the subject of Stewart Sanderson's appropriately titled *Druids-as-Wished-For*; Celtic religion also forms the subject of the articles by Ann Ross and Richard Feachem and by C. E. Stevens, while at the other extreme the function of Celtic coinage is dealt with by D. F. Allen in *Wealth, Money and Coinage in a Celtic Society*. Only a few contributions deal with methodological problems, but these include thoughtful studies by Nancy Sanders and Anthony Snodgrass, both concerned with aspects of diffusion and independent invention. A light-hearted note is struck by Charles Thomas in the last essay on *The Archaeologist in Fiction*, after which we are appropriately brought back to fact by the impressive bibliography of Stuart Piggot's publications compiled by Marjorie Robertson.

The most striking feature of this volume is perhaps the care which has been taken by the editor (himself a former student) and the publishers to make this an attractive and very personal present for its recipient. The John Piper frontispiece, the specially-written poem by the Poet Laureate and the drawing by Brian Hope-Taylor set the tone of affectionate intimacy which is continued right through the book, and imparts a certain sense of wholeness and unity in the midst of its very diversity. If we are to have *Festschriften* this one should surely be taken as a model by future editors.

J. D. EVANS

MELLAART, J. *The Archaeology of Ancient Turkey*. London, Bodley Head, 1978. 112 pp., 64 illus. £5.25.

The book outlines the archaeology and history of Turkey from c. 7500 BC to 500 BC. An autobiographical preface leads naturally into a chapter on the Neolithic, and there follow chapters on the Chalcolithic, Early Bronze Age, Karum period, Hittite Old and New Kingdoms, the Neo-Hittite States, Urartu, and Lydians and Ionians. The text is condensed, the style lively, sometimes iconoclastic. Figures are apposite and include some less well-known items. There are useful maps.

A comprehensive picture of the activities, concerns and way of life in Ancient Turkey is aimed at, in the conviction that archaeology deals with people, not just potsherds. This succeeds best in the chapters on the Neolithic and on the Karum and Old Hittite periods. Anatolia's strength lay in its mineral resources, and it flourished most when it devoted itself to peaceful trade. The E.B. florescence is attributed to a semi-concealed development of metallurgy during the Chalcolithic, and to social developments in the rest of the Near East which led to a greater demand for the metals which Anatolia could supply. The Kültepe period is the apogee of Anatolia's success, but after the Assyrian trade dried up Anatolian rulers took to plunder and warfare to maintain their standard of living. Thus the decline began, and the Hittites, by their policy of warfare and centralisation, brought about a redistribution of wealth which ruined Central Anatolia and many of its neighbours. The collapse of Hittite power, attributed finally to the Kaska, led to political fragmentation and the virtual loss of literacy. This broad, historical thesis is argued persuasively. Standard of living impresses the author more than political influence – an archaeological attitude.

The text of this book has, like so many before, to some extent fallen into the pattern of dealing with one site per period. One regrets this, because in a country geographically so diverse as Turkey, no single site can be representative of its period. But no doubt it is the book's brevity and scope which have compelled the author to be so severely selective as to make a properly balanced account impossible. Nevertheless, a few extra points might have been included. Neolithic obsidian-sources and -trade are not discussed. The chapter on the Chalcolithic concentrates almost exclusively on the West. In general the mass of recent work in the Keban and Malatya areas, although mostly available only in preliminary reports, is rather under-represented. The E.B.3 Palace at Norşun Tepe could have been a useful addition to Chapter 3. Redating of Hittite texts is accepted, but the controversy surrounding it might have been briefly explained.

Some individual comments may be made: (p. 30) E.B. arrowheads are a feature of the Elazığ-Malatya region; (p. 32) there is said to be horse in Tepecik E.B.3; (p. 58) the Deeds of Hattusilis records six years, not five; (p. 60) the Zalbar destroyed by Hattusilis I may be Zalpah on the Euphrates rather than Zalpa on the Black Sea (cf. *St. Bo. T.* 17 p. 59); (p. 67) the father of Tudhaliyas I was probably a King of Hatti also (*K. U. B.* XXIII, 27 1. 2); (p. 69) the immediate cause of the Battle of Qadesh was the secession of Amurru from Hatti to Egypt, according to the Shaushkamuwa Treaty §4; (p. 82 f.) Azitawandas is now to be read Azatiwasas (and Azatiwaras); and Azitawandiya as Azatiwataya.

The chronology of the book is based on calibrated C-14 dates and the high chronology of Landsberger. Kültepe Karum IV begins c. 2150, Karum II is destroyed c. 1940, and I.B. c. 1875. The



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accession of Hattusilis I is c. 1785, Mursilis' raid on Babylon c. 1738, and the accession of Telipinus presumably c. 1630. This leaves about 150 years for the Middle Kingdom until the accession of Tudhaliyas I c. 1475. There are advantages in this. Where they can be checked, Anatolian C-14 dates, when calibrated (MASCA 1973), fit well with historical dates: e.g. Arslantepe L.B.I. has the probable range 1690–1370 BC, its destruction being marked by the presence of Amarna-type faience beads; and the end of Korucutepe L.B.II falls within the range 1260–1170 BC. Uncalibrated dates produce such nonsense as making Anitta a contemporary of Tudhaliyas I (P-1595, Acem Hüyük), and to use them for only the prehistoric period would create an awkward bunching or overlap at the beginning of the historical era.

On the other hand, it is not yet clear whether the Anatolian evidence actually requires the Landsberger chronology. The generation-count for Hittite Kings is helpful but not conclusive. Simultaneous equations based on Empire-period dates can yield an average of 25 years from the accession of a father to the accession of his eldest son, and of 45 years to the accession of a younger son. Even supposing the absolute minimum of 45 years from Mursilis to Telipinus (Telipinus' father being unknown), and then direct succession of eldest sons through Alluwamnas, Hantilis, Zidantas, Huzziyas, Tudhaliyas I, Arnuwandas, Tudhaliyas II to Suppiluliumas, the accession of Mursilis I would have to be c. 1625. But very probably it ought to be earlier, although by how much one cannot say. And the Middle Kingdom remains depressingly obscure. The reports of Cappadocian E.B.III pottery in Norşun V might, when confirmed, tend to push the Kültepe sequence lower, for the end of Norşun IV must be c. 2150 BC on the evidence of Arslantepe C-14 dates. And the destruction of Acem III, which must fall in the Karum IB period, may be anywhere in the range 1950–1690 BC. P-1555, however, could be taken to point to an early date for the construction of the Acem palace, in the range 2150–2070 BC, unless earlier timber were being re-used. M.B.2 at Arslantepe and Korucutepe clearly ends c. 1650 BC, and is said to be related to Karum II-IB, Acem III, Alalakh VII, but also Büyükkale IV d-c. How far does it extend into the Old Hittite period? One must await the final publications.

The book is intended as an introduction for the general reader, and it admirably fulfils its purpose. It is stimulating, informative and pleasant to handle.

D. F. EASTON

KOŞAY, N. Z. *Keban Projesi Pulur Kazisi; Keban project Pulur excavations, 1968–70*. Ankara 1976. Turkish text 1–109, English text 113–237; 122 pls., and 5 colour plates. TL 200 (about four guineas) in Türkiye, \$20 abroad.

This is the first final report to appear on the rescue excavation of one of the many sites drowned by the Keban reservoir. Pulur Höyük lies north of the Murat Su, 45 km north-west of Elazığ, and is a small village mound with a deposit of 11–12 m. In three seasons of excavations the centre of the mound was stripped down to the earliest Early Bronze Age building level, XI. Below that lay a thick layer of sterile soil which covered two building levels XII and XIII of an earlier culture with poorly preserved houses, red and grey monochrome pottery and a red on white painted ware, no metal but much obsidian. The excavator calls this Neolithic (see pl. 111) but it probably presents a local Late Chalcolithic culture, also known in the Altinova south-east of Elazığ. Its precise date is not yet known. After a considerable lapse of time newcomers arrived on the site in the E.B.A. II period of Transcaucasia. They evidently came from the east at a time that according to radiocarbon dates corresponds to the beginning of the Jemdet Nasr period (and the First Dynasty in Egypt) in calibrated radiocarbon terms c. 3400 BC. A semicircular village with substantially built houses, full of architectural detail, a number of shrines and splendid relief decorated black burnished pottery lasted through three major building levels XI, X (burnt) and IX, burnt c. 3100 BC. Copper weapons and toggle pins are now known as well as moulds for flat axes, and stone battle axes are common. An unstratified cylinder seal of Jemdet Nasr – ED I type may have belonged to this period and a fine cone shell must have come from the Gulf or the Indian ocean. Four spouted pots show links with the Jemdet Nasr-Amuq G complex found e.g. at Norşuntepe in the Altinova and at Arslantepe near Malatya, but the typical Syrian reserve slip ware found at these sites does not occur at Pulur. This is important as it is often stated that the E.B.A. I in the Keban region is characterised by this ware – it is not so at Pulur, which suggests that the area north of the Murat Su may have belonged to a different culture province. Nor do we find the C. Anatolian pottery which occurs side by side with the Syrian reserve-slip ware at Arslantepe. Evidently three different cultures met in the area of the Keban reservoir. Pulur XI-IX are called 'Late Chalcolithic' by the excavator; others have suggested EB I as a more appropriate term, correct as far as the region goes, but E.B. II should be preferred as an even earlier phase of this same East Anatolian (or Transcaucasian culture) is known in Georgia and the Araxes valley, where it goes back to c. 3750 BC, i.e. contemporary with Late Uruk. This culture expanded westward c. 3400 BC, in its second phase, contemporary with Jemdet Nasr in Mesopotamia. After the destruction of Pulur IX the relief



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decoration disappears at Pulur (but not necessarily elsewhere – relief decoration being possibly related to cult vessels, as Pular tends to show) to be replaced by similar motifs now painted in red on buff pots, forming c. 11% of the bulk of the pottery, most of which continues to be monochrome black or red ware, including cooking pots with two triangular ledge handles on the rim which spread to sites like T. Khuera in North Syria, the Malatya and Elbistan regions, etc. This painted pottery becomes more common as time goes on; it is characteristic for Pular VIII–I (EB III period) and develops into the Malatya–Elaziğ type of painted pottery which characterises the end of the Early Bronze Age (previously called E.B.3, my E.B.IV), found at most sites in the area, but not at Pular which was deserted before it began c. 2550 BC. Pular VIII–VI was much reduced in size and hardly more than a hamlet and modern disturbances had destroyed all traces of architectural remains of levels IV–I. Yet even at this period certain contacts with the south were maintained; pl. 56, 214 is a Syrian reserve slip bowl (post VIII) and pl. 57, 225, 226 (unstratified), are typical Mesopotamian Early Dynastic II (c. 2900–2800 BC) flasks.

The importance of Pular for the archaeology of Eastern Anatolia lies in the architectural remains of Levels XI–IX with the shrines, decorated hearths of ceremonial (and not functionary) nature, the accompanying cult vessels with relief decoration showing human faces of deities (not bird faces as the excavator suggests) and in the change from such relief-decorated vessels to others decorated in red paint from Pular VIII onwards. It shows that from c. 3000 BC onwards a painted pottery tradition again took root in the Keban area, side by side with the East Anatolian–Transcaucasian monochrome wares. How this painted pottery is related – if at all – to the painted wares of Hasanlu VII remains to be seen. Compared to other sites, the sequence of Pular is short; yet its excavation is a significant contribution to the archaeology of the area. The book is well printed, profusely illustrated, though not always easy to use as a fair number of illustrations lack numbers or cannot be found in the catalogue and pl. 112 is clearly deficient. It remains a pity that the excavator was not enabled to realise his ambition; to locate the cemeteries of Pular Höyük.

JAMES MELLAART

BREA, L. Bernabò. *Poliochni: città preistorica nell'isola di Lemnos*. II, 1 and 2. Rome 'L'Erma' di Bretschneider, 1976. vx + 345 pp. and 28 pp., pls. 191–284. Price not stated.

The publication of this handsome volume completes the publication of the Italian excavations of this important site on the island of Lemnos; the first volume with the plans, having appeared in 1964. This dealt with Poliochni I–IV; the present volume describes the urban remains of Poliochni V (giallo) and scant pottery of Poliochni VI (bruno) and VII (viola), of which no architecture now survives.

It is in the introduction pp. 3–14 illustrated with photographs of other prehistoric sites on the island that the main conclusions are drawn. Poliochni V is contemporary with Troy II c-g and fell in some catastrophe after which it was not rebuilt. No traces of occupation during Troy III and IV were found, but some people lived on the site in Poliochni VI (Troy V and perhaps into early Troy VI period) and still (or again) in VII, the Middle and Late Bronze Age. Occupation in VI and VII are unimportant compared to the great fortified site of Poliochni V, whose culture is identical with that of Troy II, 75 km away, but somewhat more exposed to the culture of the Cyclades, than was Troy itself. At several points of the city three phases of building can be demonstrated within the Poliochni V period, which argues against the possibility of the city having outlasted Troy II and having lasted through the Troy III and IV period as well, as suggested by D. Easton (*Anatolian Studies*, XXVI, 1976, 163). The destruction of Poliochni V would thus seem to parallel that of Troy II; buried treasures were not recovered and Poliochni, unlike Troy was not rebuilt. This argues against an earthquake as the cause of destruction and enemy action seems preferable, at a date c. 2575 BC on a calibrated C-14 chronology (*op. cit.* 165). The gold hoard from room 643, pls. CCXL–CCLII, alas, not shown in colour, would then take its place alongside the jewellery hidden in Troy II g. which it closely resembles.

The architecture of Poliochni V is described in detail (pp. 17–245), but the great plans are in volume 1, for which Fig. 1, p. 18 is no substitute. What one misses is an isometric drawing and a reconstruction of the city, to round off the documentation. Perhaps more attention should have been drawn to the effects of erosion, both to the west where the city wall and adjacent quarters has disappeared and to the east of the main thoroughfare where conceivably public buildings facing the harbour have fallen a prey to the sea. Even in its truncated state, Poliochni V represents the most extensive excavated urban community in an E.B.2 Anatolian culture.

The pottery repertoire (pp. 249–314, pls. CXCI–CCXXV) is extremely limited and as dull as on the contemporary mainland and metal is rare in a plundered site.

In the absence of plant and animal remains we know nothing of the economy of the inhabitants of Poliochni; spindlewhorls suggest sheep and goat breeding; its location opposite Troy and a few marble

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Cycladic vessels pl. CCXXII, a lead figure of a lion pl. CCXXXV and an ivory cylinder seal pl. CCLIV point to trading contacts with the Anatolian mainland and perhaps the Syrian coast. Notable at Poliochni is the absence of figurines, or any structure that could be identified as a temple or shrine. It would be worthwhile re-opening this excavation and exploring the lower levels on a comparable scale.

JAMES MELLAART

VAN LOON, M. N. (ed.). *Korucutepe 2*. Amsterdam, North-Holland Publishing Company, 1978. 121 pp., 142 pls. \$84.95 or DFL 195

This is the second volume of the final report on the excavations of the Universities of Chicago, California (Los Angeles) and Amsterdam in the Keban reservoir, Eastern Anatolia, 1968–1970, and deals with the stratigraphy of the site and the Chalcolithic and Early Bronze Age finds as well as with the Middle Bronze Age fortification wall. Korucutepe is one of three major sites in the Altınova, south-east of Elazığ at which rescue excavations were undertaken before they were drowned by the Keban dam. The other two are Norsuntepe dug by H. Hauptmann and Tepecik dug by U. Esin, for which at the moment we only have a series of preliminary reports. In view of the proximity of these sites, it is perhaps unfortunate that the Korucutepe report here reviewed makes no correlations with its neighbours, both of which benefited not from three seasons of excavations, but from seven (1968–1974). Moreover the method of excavation at Korucutepe – a large number of small soundings – failed to produce coherent architectural plans and though meticulously recorded in the form of strata it is up to the reader to find out the number of building-levels within each period, and compare the material e.g. with that of Norsuntepe which was excavated on a different scale, and numbered (in building levels) from top to bottom. At Korucutepe the strata are numbered from the bottom to the top, divided into phases A–K, Early Chalcolithic to Early Iron Age like the Amuq sequence.

These cultural assemblages are graphically illustrated on Table I, p. 6 and the radiocarbon sequence figures on Table 2, p. 8. Each excavator in the Keban area seems to have his own chronological terms, so that at least a discussion of the chronology might have been presented. Stage C e.g. comprises both E.B. I and II A, somewhat confusing as strata 45–54, 5 m thick were left unexcavated. Did they represent an elusive E.B. I. or earlier E.B. II A strata? These 'early C' deposits are said not to contain the Syrian reserve slip ware found in the same period in abundance at Norsuntepe E.B. I. At Pulur (see above) the E.B. I. had no such wares, but East Anatolian wares (XI–IX) so that one just cannot argue from the presence or absence of Syrian reserve-slip whether 'E.B. I.' was present at Korucutepe or not.

The excavator's periods are based on radiocarbon dates calculated with the higher half life, not on the MASCA corrected dates. No explanation is given for this choice and it would appear to me that if the physicists now consider uncalibrated C-14 dates as incorrect, the archaeologists should no longer use them. M. van Loon's dating can also be objected to from purely archaeological grounds; phase C, c. 3000–2600 BC is a good example of guess work. It already has five successive building levels in E.B. II A plus a 5 m deposit, which he links to Norsuntepe E.B. I (with at least six building levels). Eleven building-levels in 400 years? There is one C-14 date for the period calibrated to c. 3104–71 for the beginning of E.B. II A. This would fit with the end of Pulur IX. The E.B. II A strata (5 of them) are not numbered as strata, but the unexcavated E.B. I? ones (45–54) are and 55–56 'earliest burned houses' start the E.B. II B sequence. Now such things happen frequently on digs, but are usually straightened out before publication. In the last of these five un-numbered strata the building was burnt and yielded some fine relief decorated and restorable pots. The photographs of these are atrocious so that the patterns cannot be seen; yet no drawings of these can be found in the book!

Why strata 55–51 should be called 'earliest burned houses' (E.B. II B) when the underlying (un-numbered) stratum, of five successive houses also is burned, is nowhere explained. They are in a different area (O 18) but in a stratigraphic composite table – such as the reader must build up for himself – this may appear to seem confusing.

In EB II B strata 73–74 with two C-14 dates in 73, calibrated to 2789+67 and 2820+64 BC and 2692+64 BC for 74 Accadian grey-orange stone ware is found, and van Loon dates the end of the period to c. 2300 BC. There is no discussion of the 'Accadian' pottery now known to be typical of Early Dynastic in north Syria as convincingly shown by H. Kühne in *Die Keramik von Tell Khueira*. Foreign relations are not discussed in this volume and it is hoped that a chapter on this subject will come in the third volume. The chapter on the fortification wall of the Middle Bronze Age by Carol M. Bier, pp. 47–53 is good, but it is a pity that the ceramic material on which the dating is based will appear only in the third volume, an unsatisfactory arrangement.

R. W. Brandt deals with the Chalcolithic finds, presenting the pottery on plate 103 without a demarcation line between phases A and B, and it is left to the reader to sort out where it should come. One does not do this sort of thing in modern archaeological publications. The Early and Late Chalcolithic types cover the period c. 4500–3000 BC on M. van Loon's chronology.



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The chapter on the Early Bronze Age pottery by Marilyn Kelly-Bucellati pp. 67–88 is to me the most interesting part of the book. Fuller documentation on the Transcaucasian culture is promised in her forthcoming book *The Outer Fertile Crescent in the Third millennium BC* which everyone concerned with the archaeology of this region will eagerly await. One is surprised at the paucity of material illustrated from EBA Korucutepe and though the idea of adding four colour plates of sherds is excellent, there are no references in the text to the colour plates. Moreover, most lack scales and might have been photographed on a clean and contrasting background without straw, clay or human fingers. The final two chapters on small objects record in exhaustive detail, decent photographs, but indifferent drawings, a collection of rather humdrum finds.

The absence of captions to the plates throughout the book is infuriating, many of the plans are hard to decipher as the walls are not shaded or blacked in and the master section records strata not periods, inconvenient to the reader whose patience is sorely tried by this expensive but rather careless production. It is hard not to feel disappointed with the excavation and publication of Korucutepe. The methods of excavation were not those best suited to a rescue excavation; the excavators probed Korucutepe; they did not excavate it in the four seasons they spent on the site.

The plant and animal remains recovered are very important, so is the radiocarbon sequence, but architecturally the site yielded very little of importance. The true evaluation of Korucutepe's contribution to the archaeology of the region may of course only be revealed in the third volume in which case some of my criticisms may be premature.

JAMES MELLAART

HAMMOND, Norman (ed.). *Social processes in Maya prehistory: studies in honour of Sir Eric Thompson*. London, Academic Press, 1977. xiv + 609 pp., illus. £28.00.

The somewhat pompous title of this volume belies its contents. It is remarkably eclectic in subject matter and the majority of the articles are well-written and informative.

The papers cover a bibliography of J. E. S. Thompson (to whom the book is dedicated), art, hydraulic technology, economics, the rise and fall of the Maya, metalwork, the age-range of rulers, eclipse records, patolli (a board game) glyphic texts, religion, settlement patterns – and a few more topics besides.

New perspectives and much new and interesting information is presented, a refreshing change from convoluted ceramic discussions. Only two papers had little obvious relevance to the volume: Ian Graham's 'Lord Kingsborough, Sir Thomas Phillipps and Obadiah Rich: Some Bibliographical Notes' and J. R. Acosta's 'Excavations at Palenque, 1967–73'.

The former says little of relevance to Mayan archaeology and the latter is primarily a narrative account of the 'dirt' archaeology of Palenque.

Of those topics outstanding for their novelty and deserving of mention are W. Bray's 'Maya Metalwork and its External Connections', D. E. Puleston's 'The Art and Archaeology of Hydraulic Agriculture in the Maya Lowlands' and P. Harrison's 'The Rise of the *Bajos* and the Fall of the Maya'.

The lithic bias of Mayan technology tends to be publicised to the detriment of the admittedly, small, but nevertheless existent metallurgy and Bray's paper provides a long-overdue redress. The problem of how the Maya tackled food-production to cope with population increase appears at least partly solved by the two papers dealing with hydraulic technology. Evidence is drawn not only from aerial photographs of raised field systems but from consideration of the part that static freshwater flora and fauna representations play in the Mayan religious and glyphic systems.

Of interest too is the support, albeit tentative, that Harrison's article offers to Shimkin's hypothesis that mosquito-borne diseases such as malaria and yellow fever may have contributed to the Maya collapse; swamps and silted lakes not only afford rich agricultural potential, but ideal breeding grounds for this insect vector.

On the economic front, W. Rathje and D. Phillips jnr. offer 'Streets Ahead; Exchange Values and the Rise of the Classic Maya'. At first sight, perhaps a specious argument. However, on closer consideration it seems a viable hypothesis is forwarded to explain the apparent anomalies in the distribution and type of artefact in the Core and Buffer zones. The crafty exchange systems operated by those with a sophisticated eye for commercial enterprise eventually enabled the Core area to assume not only economic supremacy, but *ipso facto*, political supremacy as well. D. Pring's article, 'Influence or Intrusion? The "Protoclassic" in the Maya Lowlands' adds weight to the idea that different ceramic traditions within an area are more likely to represent a reflection, rather than the *primum mobile* of change, and the often grossly underestimated process of trade (and thus, contact) – rather than 'site unit intrusions' (invasion), was ultimately responsible for this phenomenon.

Obviously, it is impossible to give a complete resumé of all the articles; suffice to say that they all (with the exception of the two mentioned previously) have their merits.



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The main quibbles concern the inclusion of expensive and superfluous photographs in two articles – those of Acosta and A. G. Miller ('Captains of the Itza', Unpublished Mural Evidence from Chichen Itza'). In the latter case, the photographs are simply too small to discern the all-important detail.

Six sides of computer program at the end of 'Simulation Model Development: A Case Study of the Classic Maya Collapse' (D. Holer, J. A. Sabloff and D. Runge) is of questionable interest or use.

Despite the value and readability of the book, the absurd price – £28 means it will grace the shelves of few students.

LEA D. JONES

ADAMS, R. E. W. (ed.). *The origins of Maya civilisation*. (School of American Research Advanced Seminar Series). Albuquerque, University of New Mexico Press, 1977. xvi + 465 pp., illus. \$20.00.

Dedicated to J. E. S. Thompson, this collection of fifteen papers professes its aim to be '... defining the problem and applying the data, testing theoretical formulations, and attempting to develop a reconciling model that could act both as an explanatory device and as a guide to future research.'

The book is divided into four parts: 'The Background', 'Maya Lowland Data Bases and their Co-ordination', 'External Ideas and Influences' and 'Processes and Models'. The first of these consists of one paper by R. E. W. Adams and T. P. Culbert and presents a discussion of previous hypotheses for the Classic phenomenon and several other points of value to the student. The second section, despite the complicated heading, is a resumé of findings from the major areas of current research. The last two categories are self-explanatory in content.

Most of the authors tailored their material to suit the theme of the book; a few merely chose their favourite topic and expounded regardless. In the former category, N. Hammond's 'Ex Oriente Lux: A View from Belize' was both lucid, concise and readable, a formula other contributors could have done well to adopt.

Two other articles, 'Environmental Heterogeneity and the Evolution of Maya Civilisation' by W. Sanders, and 'Maya Subsistence: Mythologies, Analogies, Possibilities' using Ibo parallels, by R. McNetting, were both short and good, providing a refreshingly different and unlaboured approach to the sometimes tired subject of land-use and environmental pressures.

Of those who presented standard material, M. D. Coe ('Olmec and Maya: A Study in Relationships') and J. Quirarte ('Early Art Styles in MesoAmerica and Classic Maya Art') are two of the more noticeable examples.

Despite Coe's assertion that '... lest I seem to be claiming that the Maya were but transformed Olmec ...' he nevertheless has difficulty in persuading the reader otherwise. There is also an apparent confusion between Mongolism and the Spina Bifida that he really means to refer to concerning the were-jaguar depictions. Quirarte's piece, differently presented, may have been relevant to the general theme but as it stands it consists of a synopsis of the art styles without much qualifying comment.

'New Archaeology' is poorly represented here (for better or worse!) and the abstruse models so beloved of Americanists appear in only two papers. Rathje, a predictable source for the 'model' aficionados, presents 'The Tikal Connection'. His goal is '... a total systems reconstruction of the specifics of Maya history'. After a methodological discussion however, he concludes that '... the Tikal connection remains only slightly refined'. The ubiquitous array of linked boxes serves only to confuse, rather than complement the text. By contrast, D. L. Webster's 'Warfare and the Evolution of the Classic Maya' is stimulating with an economic usage of diagrammatic models.

Jargon, generally the scourge of American archaeology, is minimal, manifesting itself in Rathje's article and Adam's 'Rio Bec Archaeology and the Rise of Maya Civilisation', the latter being fraught with 'systemic', 'processual', 'quantum jumps'.

The final paper, by Willey tackles the unenviable task of summarising the crucial points from all the papers in a digestible form and discussing the points raised. A long but informative paper.

The standard of illustration on the whole is adequate but Hammond's maps are largely insufficiently labelled and the diagrams (those of Sanders, too) are messy, (e.g. p. 69 where the reader must invert the book to read the labels).

On the whole the book does not present any outstanding ideas and fails to achieve the aims intended.

Perhaps the greatest gap in this field of archaeology is the dearth of reliable C-14 dates. It would have been gratifying to have seen more dates of the sort that Hammond presents for his Swasey complex, thus providing more basic groundwork.

The value of this book to the student is that it presents so much areally-specific information under one cover.

At \$20.00 it is at the lower end of the price range for books about Mesoamerican archaeology.

LEA D. JONES

## BOOK REVIEWS

BROWN, Roxanna M. *et al.* *Legend and reality: early ceramics from South-East Asia*. London, Oxford University Press, 1977. 245 pp., 230 pls. £25.00.

This beautifully-produced book is the republished catalogue of a recent exhibition of ceramics from early Thailand and Cambodia. As befits such a publication, the bulk of the volume is given over to photographs of the 219 exhibited artifacts. Of these photographs only 32 are in colour but the standard of photography throughout the book is excellent.

Roxanna Brown has written an introduction to the exhibition and each of the other three authors has contributed a short essay. In addition there are a number of line drawings of ceramic wares from Ban Chiang, Thailand; a map showing relevant sites; and photographs of two of these localities. Each of the exhibited objects is catalogued at the end of the book.

The exhibited ceramics were grouped into 3 main categories: (1) prehistoric wares from Ban Chiang, (2) ceramics from the Khmer Empire (9th to 15th century AD), and (3) Thai ceramics. Within each of these categories the artifacts were further classified on the basis of relevant factors such as shape, kiln group, glaze, or chronology (in the case of Ban Chiang wares). In her introduction Brown deals with each of these groups in turn, briefly relating the ceramics to sites and cultural traditions.

The three essays by the other authors give readers a contextual perspective of the exhibited artifacts within the general study of South-East Asian ceramics. Mention is made of the common belief in a Chinese-inspired genesis to the ceramic traditions of the area, and of the evidence for and against this theory: the 'legend and reality' of the title. The authors have compiled bibliographies for the reader who wants more detailed information.

A couple of points should be made here. Brown in her introduction is perhaps a little optimistic in suggesting dates for some of the objects. The chronological framework she uses for Ban Chiang, for instance, relies on thermoluminescent dates. But these are mostly from unprovenanced sherds and, moreover, there are no local radiation readings with which to compare them. Even Gorman, who excavated the site, has expressed a lack of faith in such dates, preferring available C-14 determinations.

Siegal, in his essay, implies a connection between the acquiring of ceramic objects by dilettantes, and archaeological efforts to reconstruct the past. This is an unfortunate association because in fact the two activities often run counter to each other. In South-East Asia in particular, archaeological studies have been hindered by the recent wholesale removal of valuable and unique ceramic artifacts for foreign sale and inclusion in private collections.

These criticisms of the text can detract little from a book the main purpose of which is to pictorially present a range of ceramic objects. This aim the book achieves very well. As an introduction to early ceramics from South-East Asia it can be recommended.

GARY PRESLAND

BICCHIERI, M. G. (ed.). *Hunters and gatherers today: a socioeconomic study of eleven such cultures in the twentieth century*. New York, Holt, Rinehart and Winston, 1972. ix + 494 pp., illus. £8.40.

Bicchieri's text consists of eleven monographs on existing or recently existing societies whose means of subsistence is/was based on hunting and gathering. The eleven groups discussed are the Copper Eskimo (David Damas), the Dogrib Indians (June Helm) and the Mistassini Cree (E. S. Rogers) from Canada; the Guayaki (Pierre Clastres) from Paraguay; the Walmadjeri & Gugadja (Ronald M. Berndt) and the Pitjandjara (Norman B. Tindale) from Australia; the G/wi Bushmen (George B. Silberbauer) and the !Kung Bushmen (Richard B. Lee) from southern Africa; the Birhors (D. P. Sirha) and the Paliyans (Peter M. Gardner) from India; and lastly the Ainu (Hitoshi Watanabe) from Hokkaido, Japan. I believe Bicchieri has provided us with a good selection of hunting and gathering societies as there is a wide variation in the geography and environment of the eleven groups selected. Most of the monographs are descriptive with an emphasis on the basic interrelationship between the environment, economy and social organisation. However, there are differences in emphasis in certain monographs. For example, Berndt (Walmadjeri and Gugadja) discusses the relationship between myth and ritual and economic organisation. Other differences arise from variations in the manner and time period in which fieldwork was conducted. Watanabe's description of the Ainu is an historical reconstruction and the essays on the Copper Eskimo and the Dogrib and Cree Indians describe the varieties of influence and interference the Europeans have had on these groups.

However, despite the excellence of the monographs I have one criticism of the book. In his preface, Bicchieri states that 'taking as axiomatic that inherent human needs are basically constant, we see that the study of societies without the complexities following upon a sedentary agricultural or industrial adaptation can offer a base for generating hypotheses concerning the elemental features of human social life' (iv). Unfortunately, although Bicchieri provides a brief introduction in each monograph, nowhere does he



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provide a synthesis or conclusion where generalisations about the elemental features of human social life could be made. He later states that this volume is closely interrelated with conferences and publications on hunting and gathering societies, e.g. Lee and DeVore's, *Man the Hunter*, and presumably it is up to the reader to consult such a text if he wishes to review any syntheses concerning the elemental features of human social life. Nevertheless, it would have been nice for Bicchieri to have attempted to make some conclusions on the main features common to the eleven societies. Instead, the reader must try to do it for himself.

Now would a book of this type be useful for students of archaeology? I believe the answer is yes. Given that human behaviour today is of a similar nature as in the past, then these monographs may be used as possible sources for ethnographic analogy, comparing aspects of past archaeological hunting and gathering societies with aspects of those surviving today. The advantage of this book is that these eleven monographs will show any archaeologists the variations in adaptation of different societies to different environments, despite the similarity in technology and subsistence. It is a point to keep in mind whenever ethnographic analogy is used as an aid in archaeological interpretation. It should only be used with caution and only as a means to provide alternative explanations. Regardless of how ethnographic analogy is used, I would recommend this book to students of archaeology, particularly those concerned with archaeological materials produced from past hunting and gathering societies.

W. B. M. WELSH

NEWMAN, Walter S. and SALWEN, Bert (eds.). *Amerinds and their palaeoenvironments in northeastern North America*. (Annals of the New York Academy of Sciences, 288). New York, Academy of Sciences, 1977. iii + 570 pp., 185 figs., 34 tables. \$30.

BRYAN, Alan Lyle (ed.). *Early man in America: from a circum-Pacific perspective*. (Occasional Papers, Department of Anthropology, University of Alberta, 1). Edmonton, Alberta, Archaeological Researches International Ltd., 1978. viii + 327 pp., 151 figs., 21 tables, 1 map. \$CDN 12.00.

DAVIS, Emma Lou (ed.). *The ancient Californians: Rancholabrean hunters of the Mojave lakes country*. (Natural History Museum of Los Angeles County Science Series, 29). Los Angeles, Natural History Museum, 1978. xv + 193 pp., 186 figs., 19 tables, 1 pl. \$10.00.

Since the inception of the idea of American prehistory the antiquity of the earliest settlement of the continent has aroused controversy between those who refuse to admit and those who enthusiastically advocate a pre-Holocene date for the initial entry.

Given a general admission of the impossibility of independent human evolution in the New World the conservative view is that entry from the Old World was only possible during a period of low sea-level which would uncover the larger part of the Bering Straits, from the Aleutian chain to Wrangel Island, and provide a connecting land mass between Alaska and Eastern Siberia. Across this bridge animals and their hunters would have been able to pass freely, it is assumed, some time after the glacial maximum c. 18,000 bp, when conditions in central Alaska and the Yukon, which were unglaciated during the late Wisconsin, would have been conducive to settlement. It is suggested that at this time there would have been an ice-free corridor to the East of the Rockies, between the Cordilleran and Laurentide ice-sheets, which gave access to central North America, and hence the rest of the continent, where the Clovis and Folsom fluted point traditions of the Llano Estacado are the earliest accepted evidence of human settlement in the New World beginning c. 12,000 bp.

The more controversial view is that the initial settlement of the Americas was either not dependent upon the presence of a land-bridge at all, the example of the settlement of Australasia is cited for the possible use of water-craft by people with a littoral adaptation moving along the western coast; or need not be tied to the late Wisconsin low sea-level but might have occurred at any time during the Upper or indeed the Middle Pleistocene. Therefore dates in excess of c. 15,000 bp, which are rejected by conservatives, are acceptable for artefactual material. The view has two corollaries: first, the primary of the Llano tradition is questioned; second, less sophisticated artefacts are advocated. On this basis simple unifacial and bifacial core-tool technologies dating to the earlier Wisconsin, c. 50,000–30,000 bp are anticipated.

Unfortunately, neither view solves the problem of the origins of the first settlers and their technology. So far the only hominid material found, mainly in California, has been of fully sapient type and probably Mongoloid, although perhaps not ancestral to modern Amerinds. This skeletal material is dated <c. 24,000 bp by radiocarbon, however, the dates of c. 50,000–40,000 bp produced by amino acid racemisation are less acceptable while the methodology of the technique is controversial. Either date is satisfactory from an evolutionary viewpoint on analogy with the Australian evidence for early gracile morphology.



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Technological antecedents for both the pressure-flaked and fluted projectile point and core-tool traditions have been sought widely in eastern Siberia and around the Pacific rim, however, none of the assemblages proposed has proved satisfactory in both technology and age. At present it is still impossible to point to an acceptable origin for anything but the very late Arctic small-tool tradition. Some of these problems are tackled in these volumes.

In 1976 a conference was held in New York on the *Amerinds and their palaeoenvironments in northeastern North America*, the 43 papers were published by the Academy of Sciences. The palaeoenvironmental papers present a uniform picture. The main Wisconsin advance of the Laurentide ice-sheet was c. 21,500–18,000 bp. Until c. 14,000–13,000 bp there were many minor fluctuations but the boundary moved only  $\pm 100$  km, in the region south of the Great Lakes. By c. 11,000 bp the final retreat was under way, the Great Lakes became ice-free and the vegetation to the south changed from tundra to *Picea* and *Pinus* forest, in Minnesota Webb estimates a mean July temperature of 15–19°C. Deciduous forest did not appear until c. 7000 bp. As the ice melted towards the continental centre land-sea-level changes occurred. In Delaware Kraft demonstrates marine littoral invasion and riverine aggradation. He suggests that most late Pleistocene sites are now destroyed since the few known are all in littoral locations. In the St Lawrence basin Kirkland by geomorphology and Harington by fauna argue that the sudden flooding of the cold Champlain Sea c. 13,000 bp would have inhibited human occupation until it drained c. 10,000 bp. Newman suggests on Long Island that despite the growth of *Picea* c. 12,000 bp and *Pinus* c. 10,500–7500 bp it was still unoccupied, although Fairbridge suggests some of the southerly parts might have been habitable by c. 12,000 bp.

The exemplary section on radiocarbon dating should be read by all interested in absolute dating. Ogden deals thoroughly with the problems of sample contamination and the interpretation both of error estimates and dates in general. He emphasises the problem of those dates which are rejected by archaeologists, frequently without explanation! The statistical work of Pardi and Marcus demonstrates the feasibility of identifying processing errors and their scope. Stuckenrath deals more specifically with dating problems in northeastern archaeology. He emphasises the need for reasonably-sized and well-stratified samples and the advisability of obtaining suites of dates.

Finally, there is a lengthy section on the northeastern Archaic and Palaeo-Indian archaeology. In this harsh environment the dearth of the latter is not surprising, and the reports on Flint Run, Shawnee-Minisink, sites in New York, the Hudson valley and New England all indicate an earliest occupation dating to c. 11,000 bp. The only exception being Meadowcroft Rockshelter where the basal layer is dated c. 19,000–16,000 bp. The validity of these dates is contested by Haynes. Stalker's suggestion, on the basis of the Taber child and Medicine Hat artefacts, of people in Alberta by 50,000 bp, possibly even during the Sangamon interglacial, c. 125,000 bp will be accepted by few. Bryan contributes two interesting papers suggesting that early material would be found in the talus slopes of collapsed rockshelters and that a more generalised economy than megafaunal hunting may have been the primary human adaptation. Fitting's application of the social anthropological theory of band-size strategies and kinship systems to prehistory is provocative.

The volume is well-printed on fine paper, however, many of the illustrations have been over-reduced. There should be more artefact illustrations, many of the archaeological papers have none. Also, the footnote referencing system is, surely, archaic. Despite these criticisms this is an important volume for all interested in American prehistory and deserves long and careful study.

At the XIII Pacific Science Congress in Vancouver in 1975 a symposium on *Early Man in America* was organised at which 34 papers were given. Of these, 26 are published here, some as written in 1975, some updated to 1977, together with 4 new papers. There is, therefore, considerable variation in style and length. Some are too short, others over-long. Some are general review articles, some are detailed site reports.

One problem with the argument for late Pleistocene occupation in America is that no two adherents accept the same sites as valid or advocate the same dates. Here Lorenzo argues, on radiocarbon dates, for *Homo sapiens* in MesoAmerica by c. 25,000 bp, while Carter, arguing the merits of his Californian core-tool tradition, accepts the racemisation dates of c. 50,000–40,000 bp on the same hominid material. Berger's paper, contrary to expectation, contributes nothing to this difficult question.

The excellent summaries of the late Pleistocene archaeology of China by Aigner and Japan by Ikawa-Smith are most welcome, much of this material being otherwise unreadable. They demonstrate clearly the problems of deriving American technical traditions from eastern Asia. None of the Chinese sites is without geological or archaeological problems while none of the Japanese material dated before c. 30,000 bp is fully accepted. The papers by Russian authors are not so useful. The brief summaries for northeastern Asia, Kamchatka and Siberia demonstrate the paucity of known material and its late date. Mochanov's paper on the Yenisei region was originally published in Russian in 1975. In it he demonstrates bifacial traditions, possibly ancestral to American, by c. 20,000 bp and suggests that by c. 11,000 bp the change to deer-hunting was due to megafaunal extinction, a situation paralleled in America.

A problem with the overland entry-route hypothesis is the dearth of early sites in Alaska and the Yukon. Powers and Hamilton report on Dry Creek, a palaeo-Arctic tradition site they link to Siberia. At

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Old Crow Flats in the Yukon, associated with dates of  $< c. 27,000$  bp, what appear to be bone tools have been found. Fladmark argues cogently for access to the West coast by water-craft since there is little evidence for severe glaciation here and the lowered sea-level would have exposed most of the continental shelf. Of course, the post-glacial eustatic rise has also drowned any evidence. Adovasio re-iterates that the dates of  $c. 17,000$ – $11,000$  bp for layer IIa at Meadowcroft are uncontaminated, thus making it the earliest authentic pre-Clovis site in North America. Despite much past criticism, arguments for the authenticity and high antiquity of the Calico Hills site are again proffered by Simpson.

In MesoAmerica, Mirambell reports on the artefacts and ecology of Tlapacoya where hearths on the lake shore are associated with artefacts and a Rancholabrean fauna possibly  $\pm c. 36,000$  bp. Page and Gruhn argue persuasively in support of the controversial artefacts from the palaeontological site of El Bosque.

In South America none of the material reported here, all artefact assemblages containing projectile points, dates to earlier than  $c. 12,000$  bp when many areas enjoyed a more favourable climate than at present.

This volume contains much interesting information, although the criteria for the inclusion or exclusion of material might seem idiosyncratic; however, the greatest criticism lies not with the content but with the presentation. While a volume at \$12.00 is undoubtedly a bargain, when the low price is bought at the cost of artefact illustrations, it is no gain. Most of the articles, particularly those where the artefacts might be controversial, have either no illustrations at all or ones of illegible quality. This in an archaeological text is unforgivable.

*The Ancient Californians* is a preliminary site report of survey work undertaken intermittently from 1969 to 1974 at the US Naval Weapons Centre at China Lake in the northern Mojave Desert, just southeast of the foothills of the Sierra Nevada and west of Death Valley. This area is now arid with a mean annual temperature range of  $15$ – $29^{\circ}\text{C}$ ,  $c. 0.125\text{m}$  precipitation, but  $c. 2.5\text{m}$  evaporation. Pollen cores from Searles Lake to the south and Little Lake to the north indicate that  $c. 22,000$ – $12,500$  bp the area carried xeric woodland and cold steppe, with deep lakes and fertile marshes. The present aridity began  $c. 7000$  bp. The major period of ecological stress would have been  $c. 12,500$ – $7000$  bp, but at all times lake levels would have fluctuated appreciably in response to small climatic shifts. The area is now dry and heavily deflated, possibly by as much as  $1\text{ km}^3$ , this has severely depleted the typically Rancholabrean fauna which comprises 9 water birds, 2 raptors, unidentifiable fragments of fish, amphibians and turtle, also *Canis dirus*, *C. latrans*, *Smilodon*, *Equus*, *Camelus*, *Bison*, *Mammuthus* and *Microtus*. All bones have been slowly carbonated and colour varies randomly from cream to black, many have fragmented during mineralisation, and all exposed material is sand-polished or desert varnished.

There appears to be some evidence for 2 moderately developed palaeosols, attributed to  $c. 12,500$  bp and  $c. 6000$  bp on analogy with soils at Lake Lahontan and Searles Lake where they are radiometrically dated. Due to high carbonate contamination here no radiocarbon dates have less than  $\pm 5000$  yr error, which is unacceptable.

The bulk of this report deals with the artefactual material which has been found on the desert pavement associated with the palaeosol remains. The author argues persuasively in favour of a long occupation chronology beginning  $c. 45,000$  bp, in which artefact morphology, relations to palaeosols and state of patination or weathering are cited in evidence. Unfortunately, these criteria do not seem adequate, nor is the evidence cited to demonstrate the sequential nature of palaeosols actually found only on the surface. The overall impression is that too many inferences have been drawn from insufficient data. It would be easier to assess the nature of the artefacts were the illustrations clearer. Despite an abundance of drawings the quality of block reproduction is such that they are illegible. By contrast the over-many site plans, while confusing in their use of symbols, are very clear.

This volume is most attractively produced, with charming little woodcut chapter heading illustrations and obviously a lot of devoted care and attention has gone into the site analysis. It is all the more to be regretted, therefore, that the visual representation is illegible and over-abundant.

In conclusion, while each of these volumes has helped to clarify the dimensions of the problem of defining and explaining the earliest settlement of the Americas, it is clear that the last word has not yet been spoken.

ESMÉE WEBB

TOYNBEE, J. M. C. *Roman historical portraits* (Aspects of Greek and Roman Life.) London, Thames and Hudson, 1978. 208 pp., 409 pls. £18.00.

In this volume the author has collected realistic portraits of Roman Republican and early Augustan leading personalities or 'notables', together with those of kings and queens of areas with which Romans were in contact in the Hellenistic and Roman periods. Roman emperors and their entourages are excluded, as well published. Thus the book constitutes a compendium of portraits of important personages



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in Roman politics but outside the imperial circle between the third century BC and seventh century AD, mostly published already but now collected conveniently for all those who wish to gain some idea of what these persons really looked like. The author has admitted only those likenesses that are identifiable, and contemporary with the subject or immediately posthumous (or based on such).

A short but excellent Introduction traces the rise in antiquity of portraiture, 'defined as the true, individual, realistic likeness of an identifiable, specific personage', from its beginnings with Alexander through its proliferation in the Hellenistic Greek world to its arrival in mid-Republican Rome, where it spread into the realms of official portraiture and ancestral masks (*imagines*). The following main text is divided into two main Parts, the first dealing with (Republican) Roman notables and the second with foreign potentates, from around the Mediterranean, from Gaul, Britain and Parthian and Sasanian Iran. Every personage is given a historical sketch; then the portraits are discussed, usually on the basis of coin profiles.

Skill and judgement are demonstrated both in the breadth of material encompassed and in the succinct handling of tricky specific problems such as the portraiture of Pompey or Julius Caesar, where fakes abound. There is little to carp at. The Commagene section (p. 139) could have been updated with a reference to R. D. Sullivan, *NC*, 1973, 18–39, and Palmvra (pp. 148–9) with M. Price, *NC*, 1973, 75–86; and from a comparison of the 'Herodias' relief (Fig. 303) with others from the same series at Petra it is now clear that in fact it represents a Muse (with theatre mask: Augustan period?). These quibbles do not, however, detract from the author's achievement in creating this invaluable compendium.

MALCOLM A. R. COLLEDGE

WEITZMANN, Kurt. *Late Antique and Early Christian book illumination*. London, Chatto and Windus, 1977. 126 pp., illus. £4.95.

This is the book of the decade.

Occasionally publishers have brainstormed and publish books of high quality, with authoritative texts, on subjects which have been previously neglected, at a reasonable price. Very few of these rare books are pleasing to the eye, but this does happen, and the book under review is one such. Add to these attributes the fact that the book is on my favourite subject, one which never fails to surprise, delight and absorb my Later Roman Empire class year by year, and the case for the use of superlatives is complete.

In 48 colour plates of high standard and perfect clarity we are led painlessly and instructively through most of the greatest examples of manuscript illumination which have survived from the Later Roman Empire. Many of these manuscripts are little known yet they form one of the most accessible peaks of artistic creation. The styles vary from the simple, almost comic, yet brilliantly coloured scenes of the Roman Virgil to the assured sophistication of the nearly contemporary Ambrosian Iliad (c. 500 AD). The oft quoted, much referred to, but seldom illustrated and rarely reproduced Quedlinburg Itala fragment appears in colour, for the first time for a general audience, in reds, blues, purples and soft pinks and greys with a sketchily impressionistic background; but this is only one page, with four scenes, a single relic from a luxuriously illustrated Book of Kings. A series of illustrations for the *De Materia Medica* of Dioscorides produced in Constantinople for the princess Juliana Anicia around 500 shows perfect herbal illustrations, and, more important for the manuscript lover, a picture of the herbal artist at work illustrating the mandrake root. Fragments of the Cotton Genesis, the well-known Vienna Genesis, the Rossano Gospels all follow, each with a coherent, tentative, brief description of its place in the series.

We end, as usual, with the Tours (Ashburnham) Pentateuch – full-page pictures to illustrate Genesis and Exodus – with crowded scenes; a picture book with brightly coloured drawings where a story such as that of Cain and Abel can unfold on three registers, or a grisly flood, with floating corpses, can take up the whole page. With the Ezra miniature of the Codex Amiatinus we cross the bridge from Late Antiquity in the Mediterranean to the flowering of British Insular art in the late seventh and eighth centuries. But that story continues in the next superb volume of the series – *Celtic and Anglo-Saxon Painting* by Carl Nordenfalk.

In the text Weitzmann summarises the work on early book production for which he is justly famous. He is cautious when trying to decide on the place of production of each manuscript, and its exact date, but it is good to have here the suggestion of Gaul as a home for the Roman Vergil, and the intriguing addition of Carthage to the possible homes for Tours.

But there is one manuscript, the most breathtaking, for which we know the origin, in Mesopotamia, a scribe, Rabbula, and a date, of 586. The canon tables of this manuscript rightly appear in full bright intricate delicate glory on the cover, but the Ascension (Pl. 36) is even more astonishing.

If this catalogue of names wakes up vague memories, go out, and buy this book to bring them all



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flooding back in detail. If you have never heard of them please look in the library to see just what they do look like; you are bound to fall in love with them, and then you too can go out and buy the book. Thanks to this remarkable volume everyone now has access to this little known world.

RICHARD REECE

TRIGGER, Bruce. *Time and traditions: essays in archaeological interpretation*. Edinburgh, Edinburgh University Press, 1978. xii + 273 pp. £5.00.

Few books by a single author could cover fields as diverse as the interplay of architecture and cult in post-Meroitic Sudan and Anglo-Saxon England, the complex interrelationships of language, social organisation and material culture in pre-colonial America, and the history of archaeological theory in Europe and North America without at times giving the impression of being a mixed bag of apodictic generalisations supported by selective citation. This collection of essays written over a decade is tied together by a concern to bring Trigger's own research into Nubian and Huron prehistory into the broader perspectives of archaeological and anthropological theory.

The essays are roughly divided into three groups, the first two dealing with a history of archaeological interpretation and Trigger's programme for future research. He gives an irenic treatment of New Archaeology from the standpoint of one of the anthropologists who reacted against the largely taxonomically oriented discipline of a generation ago in favour of a search for more respectable theoretical foundations, which for him has meant adopting a historical perspective. Without denying the importance of environmental and economic variables, Trigger tends toward the definition of prehistoric archaeology as a sort of palaeosociology in the third group of essays which conclude the book. Here he deals with a rich range of topics including the archaeology of government, the relation of demography and administrative evolution to unequal status and access to information, and the intersocietal transfer of institutions, values and styles, as well as a wide-ranging essay on the non-environmental determinants of settlement patterns.

This larger picture is necessary to bear in mind but it suffers from a lack of concrete examples drawn from excavation reports, and other archaeologists might legitimately wonder whether in the long run this sort of archaeological interpretation is any more subject to proof than lineage, language, genetics, cult or any of the other hoary subjects which have been comfortably toasting in the fires of archaeological controversy since the antiquarians Piggott has chronicled in another series of essays put out by the same publisher.

One of the valuable aspects of this work is the way in which Trigger's outline of archaeological theory complements and updates previous histories of archaeological development. His contrast between European and North American archaeology, while serving as a useful expository convention, may be too sharply drawn. The economic and environmental approaches which characterise the work of European prehistorians such as Crawford, Clark and van Giffen from the 1920s into the 1950s (and beyond) were paralleled in the work of Kidder, Willey, Steward and Braidwood. And the application of statistical methods to archaeology and anthropology by Boas, Nelson, Petrie and Montelius at the beginning of this century occurred almost simultaneously on both sides of the Atlantic. On past and present applications of statistical methods, however, Trigger is silent when he is not openly dismissive – is this an artifact of the reaction against taxonomy?

In his historical outline Trigger draws an interesting contrast between the psychology of prehistorians in Europe and North America which Mulvaney has also drawn attention to in Pacific studies. In Europe and the Third World local interest and pride in regional cultural developments before written history have helped shape archaeological research, but the violent and complete break between present-day and past cultures in North America and other areas of NW European settlement led to a lack of interest in, and even a denial of indigenous historical development and institutional evolution.

This raises a methodological problem. Given the intrinsic connection between the current interest in political archaeology and the North American anthropological tradition, is it possible that this is an updated expression of the same bias? Further excavation and research may not bear out cross-cultural anthropological systems models; they are likely to lead to more, not less, regional specialisation, as the actual finds and details of the occupation of a site or a group of sites at a given time cannot help revealing a plethora of particularising detail about the functional and ethnographic record of a given community. Thus research strategies must be adapted to local circumstances. Here is where the radiocarbon revolution has affected American anthropology as deeply as European prehistory. On both sides of the Atlantic the recalibration of chronology has freed taxonomy from the task of providing dates by seriation and through the search for cross-cultural parallels. This leaves the important problem of correlation between regions and groups within them unresolved, but by introducing an independent variable it has stimulated the search for others. Trigger has given a thought-provoking introduction to the background and preliminary results of this search.

R. MILLER

## BOOK REVIEWS

WALKER, D. R. *The metrology of the Roman silver coinage* Part III, from Pertinax to Uranius Antoninus. (B.A.R. Supplementary Series, 40). Oxford, British Archaeological Reports, 1978. 159 pp. £3.20.

With part three of this series the main part of the undertaking is complete, and besides the actual analyses of coins from 193 to 253 we are given a survey of the work to date, and thoughts on the debasement of the Roman silver coinage from Augustus to 253 AD. Comments on the analyses, and the information derived from them have already been made in this Bulletin (14, 1977 and 15, 1978) and there is little to add here. One point which is now perhaps ripe for thought is the correspondence between this method of analysis, X-ray fluorescence, and the destructive methods which can, under the proper conditions, give unassailable results. It has been an explicit point of reserve with these volumes that although the relative silver contents which they quote for Roman coins should be exact, these results cannot be taken as absolute values. Now we have Walker's results for the period of the great Severan debasement which has been extensively worked over by destructive analyses, and we can compare the Walker results with the results of 'wet analysis'. It is slightly disappointing that Walker himself does not do this. The general figure for the silver content of coins from 194 to 217 from gravimetric analyses is taken to centre on 48% of silver; Walker's results have a consistently higher mean around 50 to 54%. This discrepancy is not great, but it might suggest that the X-ray fluorescent results might be consistently on the high side.

Turning to points of interpretation the possibility of earlier denarii being overstruck in times of crisis is mentioned, but not always kept in mind; it could, for example explain some of the very high silver values for occasional coins of Gordians I and II. The interpretation of the new radiate coin in 214 as a form of debasement, and its correlation with changes in the gold standard is excellent and makes very good sense.

One general point of criticism is possible on the atmosphere of the volume; is it my imagination, or is Part III rather more abrasive than the earlier parts? I hope not. This may link up with the failure of the author to cater for illiterates like myself who do not read Greek. But minor quibbles must not be allowed to detract from such a valuable work.

RICHARD REECE

HEALY, J. F. *Mining and metallurgy in the Greek and Roman world*. (Aspects of Greek and Roman Life). London, Thames and Hudson, 1978. 316 pp., 28 figs., 73 pls. £11.00.

Professor Healey has endeavoured to write a book which would satisfy the interests and demands of the archaeologist, metallurgist, student and layman alike. He has tackled this difficult task with enthusiasm as he draws on a mass of excavated evidence and a large range of contemporary Classical accounts. The book is divided into ten profusely annotated chapters each dealing with one of the myriad of topics under the broad canopy of Classical mining and metallurgy. The first two cover the geological, mineralogical and metallurgical backgrounds; the third and fourth deal with the sources and methods of mining practised in the Classical world, while the fifth follows with an interesting account of mine ownership, administration and conditions of operation and work as derived from contemporary literary sources. The following three chapters detail the processing and refining of ores, the characterisation of minerals, metals and alloys, the properties of metals and the various effects of the different treatments which were practised, while the final chapter covers the use of metals, their compounds and alloys. The book ends with a very useful and comprehensive bibliography and index, while the chapters themselves are interspersed with an excellent series of black and white photographs together with a complementary range of good in-text line drawings and maps.

This addition to an already popular series appears at a time when archaeo-metallurgy, like so many other disciplines within the confines of archaeology, is rapidly developing as a subject in its own right and overall, the book succeeds by producing an easily readable amalgam of technical information and narrative accounts of Classical mining and metallurgy. Here and there though, the technical aspects might have been tempered with a little more of the social and economic ingredients so expertly expounded in Chapter 5, and hinted at in Chapter 10. The Classic metallurgists were no doubt veritable masters of their craft, as indeed this book points out, but were not ordinary folk more conversant with the use to which metals were being put, and were they not more aware of the temperament of the local smith or itinerant tinker who supplied them with their needs, rather than the complex properties of these invaluable and indispensable raw materials? Small errors here and there detract from the generally high



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standard of the work, e.g. map, pp 50–1, Pentre is too far west, Alderley Edge too far north, and surely 'Shrewsbury' ought to read 'Wroxeter', and appear further north? Despite these, though, the book is – dare it be said – a mine of useful information and presents a worthwhile investment at the price, admirably complementing other titles in this excellent series.

RICHARD S. KELLY

TYLECOTE, R. F. *A history of metallurgy*. London, Metals Society, 1976. 182 pp., 149 illus. £11.00.

In the author's words, this volume is 'an introduction to the history of metallurgy from the earliest times to the most recent.' It covers the development of metal usage, production and technology on a global basis.

Of the many possible ways of tackling such an all-embracing subject, Dr Tylecote has approached it chronologically – dividing the early chapters into archaeological periods, the later ones into historical periods. However, the text is far from being merely a compilation of archaeological and historical speculation – 'maximum importance being attached to the material evidence and relatively little to the documentary evidence.'

Each chapter contains a general discussion of the development of the technology of that period. In the earlier chapters, this is followed by a summary of the state of the art in major geographic areas and, in later chapters (where more sophisticated production techniques are discussed), by separate sections – on ferrous, non-ferrous and precious metals – which incorporate geographic comparisons. The archaeological and historical evidence and hypotheses are put forward for the earliest use of particular ores, metals, alloys and techniques (eg. smelting, melting, casting, moulding and working) with particular emphasis on the development of early smelting. This framework is greatly enriched by the inclusion of the results of the author's and others' experimental evidence of the technological possibilities and impossibilities, and a good dose of fact.

A particularly good example of the usefulness of this down to earth type of approach is the section in the chapter on the Early Bronze Age which deals with the ever-recurrent 'Problem of Tin.' Here, the author discusses the known tin deposits of the world, the form in which tin ores are found, the possibility of copper ores being contaminated with tin (and the as yet unfound sources in the Near East), the likelihood and evidence of long distance trade in tin metal or ore and the evidence of early bronze production technology.

The scope of this book is such that it will be invaluable to students of many disciplines – particularly of history, archaeology and metallurgy – containing information on a wide variety of subjects (eg. from Aztecs to aluminium, coins to corrugated iron, ingots to isotopes and waterpower to wootz). To aid the reader, the appendices include: a glossary of technical terms; historical chronologies and sketch maps showing the positions of the major sites referred to in the text. For the specialist student who finds insufficient material presented in the text, Dr. Tylecote has provided comprehensive bibliographies (containing up to 164 references) at the end of each chapter.

The publisher's poor presentation of the book (soft cover, two columns of unjustified print per page) does not do the content the justice it deserves and, if this was done to reduce costs, then it does not seem to have had the required effect on the retail price.

It is inevitable that such a short book on so vast a subject does not go deep enough into any particular aspect, but the author is the first to recognise this in his introduction, 'A study of this magnitude cannot be treated adequately in one volume and it is intended in the course of time to cover this field in a multi-volume work.' Meanwhile, we are fortunate to have been presented with such an adequate introduction to this subject by the one person most suitable equipped and experienced for the job. We await eagerly the results of Dr Tylecote's continuing dedicated efforts in this field.

JAMES BLACK

AGACHE, Roger. *La Somme préromaine et romaine, d'après les prospections aériennes à basse altitude*. (Mémoires de la Société des Antiquaires de Picardie, 24). Amiens, Musée d'Amiens, 1978. 515 pp., 41 figs., 278 pls.

This book is a synthesis of the aerial photography programme carried out by M. Agache between 1961 and 1976. It is roughly divided into two parts, the first concerned with the aerial photography of the region and the second with the archaeological traces photographed.



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In the first part there is a detailed explanation of the methods used and the aims of the flying programme, both of which are relevant to the practice of aerial photography for archaeology in this country. Of the methods, the most pertinent is that Agache flew in all seasons of the year and repeated flights over known sites again and again as well as searching for new ones. In this way he was able to make use of the different seasonal properties of the soil and the crops to bring out details of particular sites which would not have been seen if, for instance, all the flying had taken place in the summer. Thus, on pp 172–3 there are two photographs of a small Roman building surrounded by a ditch system. In one the building alone is visible after its foundations had been brought to the surface by deep ploughing but in the other this is merely a blurred trace in ripening corn while the surrounding ditch system is clearly visible. Also, Agache makes use of damp-marks on bare soil to a much greater extent than any air-photographer in Britain, partly due to the higher incidence of these marks in France, but also due to his dedication to winter flying at times when conditions are right for their appearance. Some of the traces are remarkable (eg. on p. 135), especially in view of their occasional occurrence on soils where no other marks are usually visible. There is obviously scope for investigating damp-marks further in Britain.

Using the experience gained during his own flying programme, (which incidentally was remarkably fruitful given that in 16 years he only flew 750 hours (p. 35).) M Agache proposes a scheme for undertaking regional aerial reconnaissance (pp. 59–60) obviously with the aim of persuading others to do so. It involves, in the following order, an archive search, summer flights backed up by winter flights as an initial reconnaissance and then detailed re-flights over each site, preferably during the winter but in the summer if there is crop rotation or periods of drought. It is a pity that he does not stress at this point the importance of taking photographs with a view to compiling plans of the sites from the results of a number of seasons' flying. The plans in the later chapters indicate that Agache realises this importance but he is not explicit about the subject in the text. How unfortunate it is that this seminal book for French archaeologists encourages aerial photography in other regions but does not say anything about the methods of photography necessary for accurate plans to be made from the results. This point aside, it can only be for the better that Agache's methods and results have been published in this way for they show that intensive and repeated aerial surveys of limited geographical extent, properly planned, executed and published are of enormous benefit to archaeological and historical studies, much more so, in fact, than the amassing of aerial photograph archives without a particular aim in mind, as is all too often the case elsewhere.

But M Agache is so much more than just a brilliant aerial photographer, important though that facet of his work is; this book shows him as a profound archaeological thinker, and such people are very rare. The chapter which stands out is not on Roman fortifications, though we now have some 'Caesars Camps' which really could be true, nor the Gallo-Roman villas, nor the Rural Sanctuaries, but (to paraphrase) 'From Gallia to de Gaulle'. Agache has not only proved to the sceptics of aerial photography that his ideas work, but has proved that it is possible to think constructively about the origins of the medieval and modern French landscape, and he puts those origins firmly back into that misty period of the *Bas Empire*. He does this, not with vague generalisations, or rare historical references, but with firm aerial photographs of the conjunction of villas with villages, villas and deserted hamlets, and villas and châteaux.

One of my favourite roads in France was once a quiet single track running absolutely straight south-east from Amiens to Roye; I never realised 'till I read this book that I was travelling through some of the most densely settled villa territory in France. All I noticed was the occasional speed limit as I passed through a village. Now the road is a dual carriageway, and one lane curves out to by-pass each village so that the modern settlement is even more noticeable. The point is not to reminisce but to agree with and emphasise one of M Agache's main points.

His great series of photographs of villas show sites in the middle of ploughed fields, totally deserted. The modern and medieval settlements in the same region are nucleated villages, often on the main roads. Thus the facts; it is the interpretation which matters, for Agache suggests, first, that these villages have their origins in times when the villas were still extant, or only recently defunct, and secondly, that his distribution maps as we have them at present are almost totally lacking in villas which continued through the third century, or were refounded after the German troubles, to become the nucleus of such villages. Any sceptic must start with plates 259 and 260, interpreted on Fig. 39 where the village of Laboissière can be seen growing up alongside the wall of the villa enclosure.

But then, if the sceptic is English he will probably not read this book, and will spend his time instead flying more disorganised sorties, or digging up yet another villa of the fourth century.

If the importance of any book were to be judged from the length of the review we should extend this already long encomium for several pages. Suffice it to say that this is one of the most remarkable archaeological books to be published in the 1970s for it puts forward a great new field of source material and makes leaps forward in synthesis and interpretation at the same time. It comes from France, which should make us a little more careful in our remarks on French archaeology, is printed on excellent paper, well bound, with brilliant reproduction of photographs, and costs less than £20.

ANTHONY KING AND RICHARD REECE

## BOOK REVIEWS

SPRUYTTE, J. *Etudes expérimentales sur l'attelage*. Paris, Editions Crépin-Leblond, 1977. 143 pp., 17 figs., 37 pls. F45.

M Spruytte, ex-cavalryman and professional horseman, has written an excellently illustrated account of very original reconstructions and tests he has made of ancient horse drawn vehicles. He discusses existing theories of how early horse traction was effected. Here the basic authority has always been Lefebvre des Noëttes: *L'attelage, le cheval de selle à travers les âges*, Paris, 1931, and this book is a good follow-on which advances the subject and draws attention to important mistakes made by the earlier writer. The glossary of technical terms is most valuable.

M Spruytte made and drove replicas of the type of chariot found in Tutankhamun's tomb, a Greek chariot of the 5th century BC, a Chinese chariot of the 2nd century BC, and a vehicle of the type seen in the Tassili rock paintings. These vehicles differ greatly in the harness through which the pull is taken, and it was this that the author particularly wished to test, rather than the vehicles. He makes the point that it is the animal available that determines the design of the vehicle. From his practical study of the harness he deduces the kinds of animals used and reaches new conclusions which must make us reconsider accepted views on vehicle design.

The research undertaken has been most painstaking. One wishes that one was given exact figures for vehicle performance which would enable other researchers to compare M Spruytte's results with theirs, instead of subjective evaluations, while recognising that this was not the author's principal research interest.

The book finishes with a chapter on the development of wheels and traffic ordinances and the origins of draught horses.

This book is a most valuable original contribution to the experimental archaeology which is so necessary if our understanding of the evidence is to be advanced. M Spruytte and his assistants are to be congratulated on the results they have achieved in what must have been an arduous and risky business. We hope he will continue with his experimentation.

DUNCAN NOBLE

ROGERS, Alan (ed.). *Group projects in local history*. Folkestone, Wm Dawson and Sons, 1977. 245 pp., illus. £7.00.

This collection of essays, designed to provide expert guidance on various topics to groups embarking on local history projects, unfortunately offers no introductory explanation to place the collection in its context, so that one is left wondering whether the occasion that prompted its publication was a conference or simply someone's good idea, and also who are the various contributors and what their particular interest in the subject. An explanatory note would have been welcome.

Two introductory essays, which tend to stress roles in the group, and particularly that of the 'leader', rather than concentrating on the importance of establishing clear aims, and allowing common-sense, enthusiasm and sensible cooperation to achieve these, pave the way for chapters on landscape studies, vernacular architecture, work on various types of records, and on industrial archaeology.

Unfortunately, some of these may be more discouraging than encouraging to potential groups of workers; they are sometimes patronising in tone and often the suggested undertakings are too large and unwieldy for beginners. What is surely wanted initially is a small-scale, clearly-defined project which can be published before interest is lost, and which will form the basis of a larger piece of work which can be undertaken when the various participants know better what this will involve.

Others, however, such as R. A. Machin and Martin Gaskell in their respective chapters on rural and urban vernacular architecture, Christopher Charlton on historical demography, Rex Russell on parliamentary enclosures and John Phillips on census analysis, provide much sensible advice on recording procedures and on the importance of relating each topic both to its historical setting and to the landscape. There are invaluable guides to source material and general bibliographical aids, and it was especially pleasing to see *The Diary of a Nobody* being included along with the more usual works by Dickens and Gaskell in the chapter on 19th-century urban housing. All these essays are particularly successful in pointing out the advantages of working as a group rather than as individuals in each particular area.

In an excellent chapter on industrial archaeology, Michael Lewis divides possible activities into four – location, examination, interpretation and recording; a fifth might have been included – that of restoration, which is often a very worthwhile objective undertaken by such groups – just one example would be the work presently being done by the Wantage IA Group in conjunction with Oxfordshire County Council on restoring a corn mill at Charney Bassett, Oxon. (see *Industrial Archaeology Review*, 2: 3, 1978). Mr Lewis also makes one very important point – that even the most inexperienced amateur has a place in industrial archaeology, which involves recording without excavating (or risking destroying unrecognised evidence) – a point which could be extended to all the topics in this book.



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The chapter on local nonconformist history by Denis Stuart is disappointing, concentrating as it does on Methodist and Quaker records only. Some of his statements regarding adult education are hard to justify, and his introduction to the subject rather depressing. He sets out the problems, but fails to offer the lively and imaginative approach which he advocates. A 'case-study' on his own first-rate work on Friends' burial grounds in Staffordshire (*South Staffordshire Archaeological and Historical Society Transactions*, 12, 1971) would have provided a splendid springboard for this chapter. Also, I feel that few would agree that the purchase of a portable photocopier is essential to the worker in local history. Some help is offered on bibliographical aids, although perhaps a *caveat* might have been added when commending Vol. II of the *National Index of Parish Registers*, which is on occasion misleading. (The section on the *General Register of Births kept at Dr Williams's Library* gives no indication that these are now housed at HM Land Registry, for example.) No mention is made of some of the excellent national libraries in London, such as Dr Williams's Library, the United Reformed Historical Society Library, Lambeth Palace Library, all of which will sooner or later be essential to the worker in this field.

A final chapter on writing and editing by Bernard Jennings highlights what should be the successful culmination of every project undertaken – publication. More emphasis might, however, have been placed on the necessity to place completed projects at the disposal of other workers.

The book as a whole suffers from a somewhat uninviting appearance – the paper is poor and thin, always an unwise economy. Some of the figures, particularly those on graph paper, are difficult to study, but it is certainly helpful to give so many examples of various types of record, etc. Some of the information provided is out of date – any reader who followed the advice on p. 23 regarding the National Central Library would find it hard to track down, since it has not been in existence since July 1973.

This book achieves only in part what it sets out to do. It attempts to approach the fast-growing involvement of the amateur in local history from a new slant, but too often the essays are not aimed at the groups who will find the book most useful, informal groups outside the *aegis* of formal tuition groups; the WEA classes at whom some of the chapters seem to be directed will, after all, presumably be provided with a competent tutor to guide them. However, new groups wishing to make a useful contribution to local historical studies will find some encouragement and practical advice in this volume.

FRANCES MCDONALD

LYONS, Melvink, M.D., F.A.S.C. *The care and feeding of dirt archaeologists*. Cambridge, Mass., American Schools of Oriental Research, 1977. 76 pp. \$2.50.

Public health services are never so much appreciated as on some Near Eastern tell when one is personally attempting to perform all of them at once. This little booklet provides a compact summary of necessary public (and private) health measures needed in just this situation. Produced by the American Schools of Oriental Research, the information parallels that which has been provided on a rather broader scale by 'the little red book' of the Ross Institute of Tropical Medicine ever since World War I. So it seems a bit of an overstatement for Dr Philip King in his *Foreword* apparently to credit Ernest Wright with introducing cautionary health measures in Levantine archaeology no more than a decade ago.

The booklet seems chiefly for field work in Israel, although the same precautions – and possibly more – are needed in adjacent areas. Useful information could be added to include a census on the safety of the drinking water in various large cities outside Israel and an evaluation of hospital and other medical service in these cities; the statistical probabilities of sickness from, say, one swig from a possibly infected source; how best to tell if various infections are present in water for bathing if information is not provided by the government.

Two great day-to-day problem areas are dealt with most informatively and in detail. These concern dehydration and gippy tummy. A person's thirst is, apparently, an inadequate indicator of too low a water table and three-and-a-half quarts of liquid per day should be drunk – in any form but that of alcohol. Watch also for the depletion of the electrolytes. All can be replaced with *Dardex*, said to be better than salt tablets for sodium depletion. We learn also that the rationale for the Arab head-toe coverup is to pool perspiration as well as keep the sun off.

With luck and the application of the practices recommended, an excavation season may pass with no great health problems, but gippy tummy, *shil-shul*, Montezuma's revenge, or what have you, is almost inevitable. Apparently an act of God, the cause, we are told, is unknown, but the complaint is probably due to the introduction of a virulent form of the colon bacillus *escherichia coli*. (If, as stated, it does not arrive by air, water, or food, how *does* it reach one's innards?) We are told that the problem is self-limiting (three to seven days in duration), that a vaccine is on the horizon, and that one can currently take *Streptotriad* (British) or *Streptomagma* or *Polymagma* (American) as prophylactics. A good thing to know is that the popular remedy *Lomotil* is counterindicated for those also suffering from hepatitis.



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Suggested foods for the gippy tummy sufferer include hot tea with sugar or *Dardex*; hot cereals, especially rice and barley and barley water; poached eggs; boiled chicken; and, very surprisingly as fruit is otherwise off the diet, apple sauce. Leban or yogurt (when made of pasteurised milk) restores the normal intestinal flora.

Useful check lists of items for personal and dig first-aid kits are given, though the latter would seem to call for administration by someone with medical training. Since the subjects dealt with inevitably must be scattered throughout the leaflet to avoid too much repetition, an index would assure maximum utility.

FRANCES JAMES

EVANS, J. G. *An introduction to environmental archaeology*. London, Paul Elek, 1978. xiv + 154 pp., illus. £5.95 hardback; £2.95 paperback.

This is a much-needed background text in environmental archaeology which should prove useful not only to undergraduate students of archaeology but also to those archaeologists who acquired their archaeological education in the days when environmental studies were not fashionable, or in university departments which have still not heard of environmental archaeology.

The book is especially valuable as it concentrates on the sources of evidence which may be exploited by the environmentalist when reconstructing ancient environments. The author has effectively divided the work into three parts. The first deals with the environmental factors which may influence man and his activities. These factors are discussed separately and it is a pity that they have not been drawn together in a general discussion of the ecological systems in which man may have been living, and of which he was a functional part. Although it is necessary to have some understanding of the individual components of a system, it is also necessary to attempt to understand how these interact with one another in the real world. Such concepts are not easy to introduce in an elementary text and Dr Evans discusses them more fully in his admirable book *The Environment of Early Man in the British Isles* (Elek, 1975). The second part of the book considers the nature of the evidence for earlier ecological conditions, with chapters on the plant remains, animal remains, and soils and sediments. The usefulness of such evidence is discussed as well as general problems of interpretation; field and laboratory methods are not described in any great detail. This is an intentional omission by the author and, I think, a sensible one. The final part of the book describes the range of contexts which may yield information and materials of value to the environmentalist. Natural and archaeological situations are discussed, with special emphasis on the problems of interpreting material derived from different contexts, and this should prove to be of particular value to the field-worker.

This book is well-written and is illustrated with clear line drawings; it is well-produced and reasonably priced. I can recommend it without hesitation.

K. D. THOMAS

BUSVINE, J. R. *Insects, hygiene and history*. London, Athlone Press, 1976. 262 pp., illus. £6.95.

CLOUDSLEY-THOMPSON, J. L. *Insects and history*. London, Weidenfeld and Nicholson, 1976. 242 pp., illus. £8.50.

The study of insect remains from archaeological sites is a comparatively recent and rapidly expanding area which is producing interesting, and often provocative, ideas. These books are not, however, about the physical remains of insects recovered from excavations (in fact such evidence is not mentioned by either author) but are fascinating accounts of the past relationships between man and the insect world. They should be read with benefit by archaeozoologists and with great enjoyment by a more general readership. Both authors are Professors in the University of London, Busvine at the School of Tropical Medicine and Hygiene and Cloudsley-Thompson at Birkbeck College; they are highly respected in their respective fields of study and, most important, they both write extremely well.

Professor Cloudsley-Thompson's book begins with a study of epidemic diseases, particularly those transmitted by insects, in the ancient world and with particular reference to Greece and Rome. These accounts are largely based on contemporary sources which the author has skilfully woven together to produce a fascinating picture of life and death in earlier times. This is followed by a consideration of the relationships between war and pestilence in the past with special reference to the possible tactical consequences of rampant disease. Subsequent chapters deal with specific man/disease/insect relationships, such as fleas and plague, mosquitoes and malaria and insects and typhus. The Plague of Locusts is discussed and the author reveals the origin of the Tarentella dance, it being associated with sufferers of St

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Vitus' Dance, a disease once thought to be transmitted by the bite of a tarantula spider and cured by energetic dancing. On the positive side, manna, honey, cochineal, shellac, and silk are revealed as benefits from the insect world. This book is a mine of interesting, and often surprising, information.

Professor Busvine adopts a more academic approach, starting with an explanation of what insects are and how they live, with special emphasis on the life-styles, adaptations and evolutionary history of harmful insects. This is followed by a chapter on the effects of such insects, particularly of the diseases that they may transmit. The remainder of the book deals with human attitudes to harmful insects; the prevalence of different parasites in different periods, human responses to them, and the scientific and medical study of them. Busvine's approach is essentially an historical one and he quotes extensively from the writings of early scholars (mostly Medieval and later). Early ideas and misconceptions are presented clearly and sympathetically, although not without humour. The text is well-illustrated with old paintings and cartoons, some of which are very amusing. In addition, the author quotes a number of 17th and 18th century poems about fleas (some of which he has translated); these are delightful, although a few are delicately indelicate.

It is quite impossible for me to choose between these books; I recommend both without hesitation. They are authoritative, informative and, above-all, a really good read.

K. D. THOMAS

BÖKÖNYI, Sandor. *Animal remains from the Kermanshah Valley*. (B.A.R. Supplementary Series, 34). Oxford, British Archaeological Reports, 1977. 135 pp., 35 figs. £2.60.

The publication by Sandor Bökönyi on the *Animal Remains from the Kermanshah Valley* is a welcome addition to the cultural and environmental evidence already published.

Four sites from the Valley are reported; Tepe Asiab, Tepe Sarab, Tepe Sahbid, and Tepe Dehsavar. From a faunal and economic point of view these four sites offer an unique situation in terms of controlling for environmental factors as they lie within a 10 km radius of each other and were occupied between the 9th and 4th millennia.

Description of the site faunas includes information on morphological change, sex, age, pathological conditions, and domestication. This is complemented by drawings, measurements, and photographs which substantiate the descriptive evidence.

The avifauna report by D. Jánossy was extremely helpful. Without it interpretation of the site occupation would have not been possible.

The completeness of this report might be disputed as it did not contain enough measurements for some bones yet the evidence presented, including that of the earliest domestication of goat, is a significant contribution to Near Eastern prehistory.

CHARLES A. SCHWARTZ

## BOOKS RECEIVED

The following books have been received. The fact that they are listed here does not preclude their review in a later issue.

ALLCHIN, B., GOUDIE, A. and KARUNAKARA, H. *The prehistory and palaeogeography of the Great Indian Desert*. London, Academic Press, 1978. xix + 370 pp. figs. and tables. £25.00

BATEMAN, Thomas. *Ten years' diggings in Celtic and Saxon grave hills, in the counties of Derby, Stafford, and York from 1848 to 1858*. First published 1861. Buxton (Derbyshire), Moorland Reprints, 1978. xiv + 309 pp., illus. £8.00.

BELLWOOD, Peter. *The Polynesians: prehistory of an island people*. (Ancient Peoples and Places, vol. 92). London, Thames and Hudson, 1978. 180 pp., 107 illus. £7.95.

BLANTON, R. E. *Monte Albán; settlement patterns at the ancient Zapotec capital*. London, Academic Press, 1978. xxvi + 451 pp., figs. and tables. Separate archaeological map. £15.95.

BOARDMAN, John. *Greek sculpture: the Archaic period. A handbook*. London, Thames and Hudson, 1978. 252 pp., 271 illus. £5.50.

# BOOK REVIEWS

- BRADLEY, R. *The prehistoric settlement of Britain*. (Archaeology of Britain series). London, Routledge & Kegan Paul, 1978. 155 pp., figs. £7.75.
- BROWN, David. *Anglo-Saxon England*. London, The Bodley Head, 1978. 112 pp., illus. £5.25.
- BRUCE-MITFORD, R. *The Sutton Hoo ship-burial. Vol. 2, Arms, Armour and Regalia*. London, British Museum Publications, 1978. xxvi + 651 pp., 443 figs., 36 tables. £50.00.
- BURKE, John. *Life in the villa in Roman Britain*. London, Batsford, 1978. 120 pp., 82 illus. £4.25.
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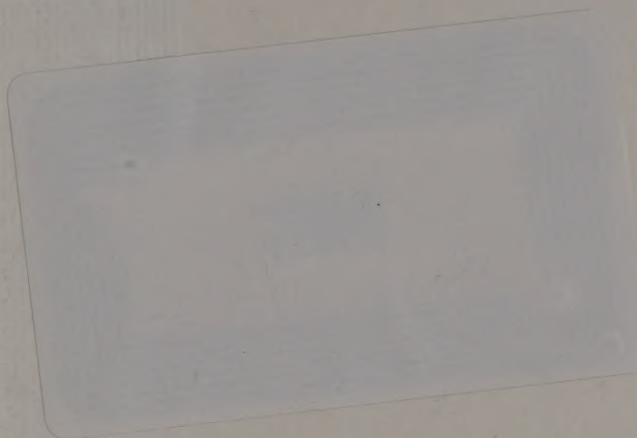












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